MONTANA OUTDOORS

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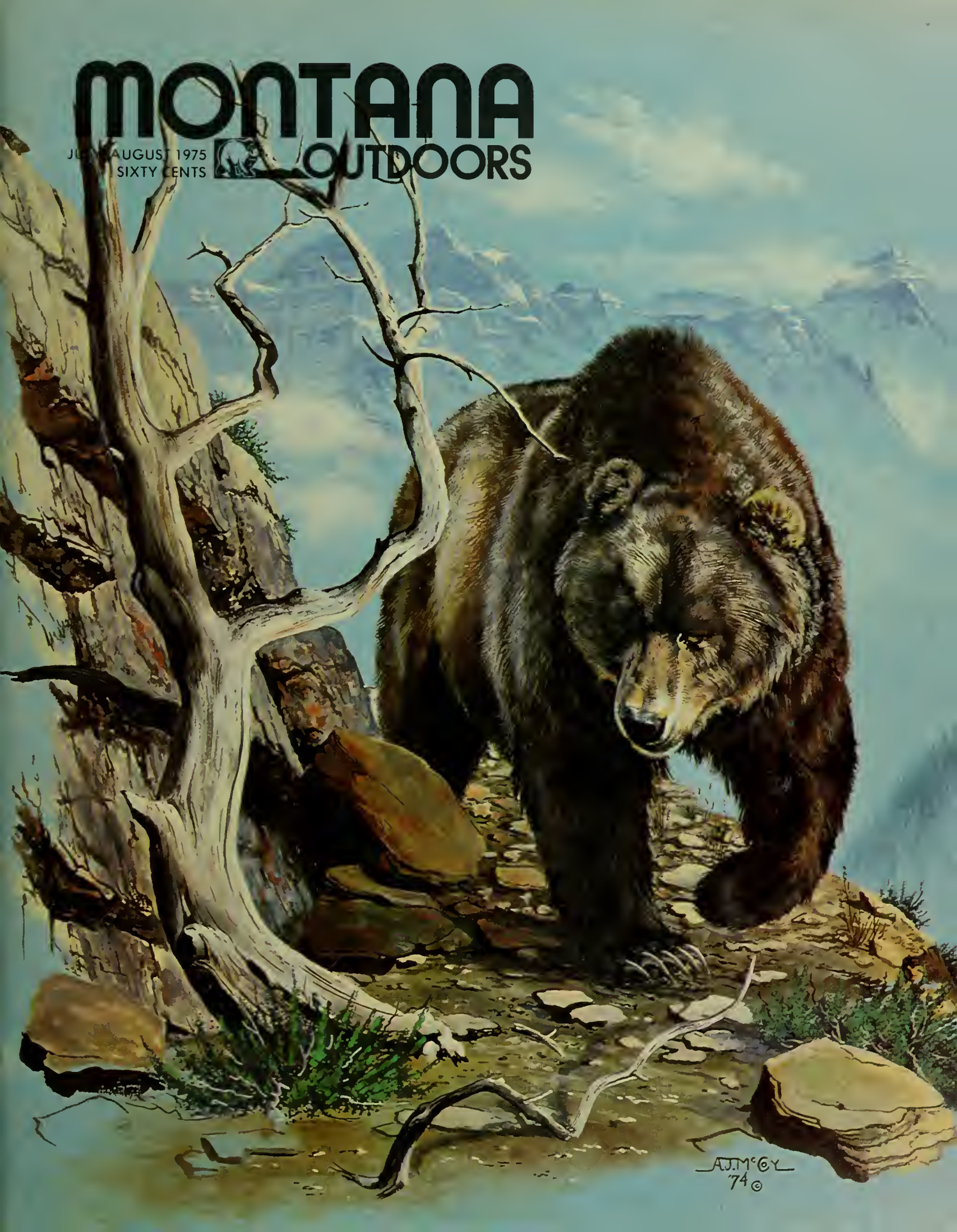

MONTANA OUTDOORS

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the cover

The grizzly bear, "the harrible bear" of the western wilderness, is naw the facal paint of a notional cantraversy. Peaple everywhere want the grizzly kept aff the extinct list sauth af Canada. The article an page 2 helps explain the grizzly's problems and suggests what a cancerned public can da ta make sure the great bear daesn't disappear from Mantana. Front caver watercalar by A. J. McCoy. Fly fishing and fly tying canjure up visions of averly technical recreatian ta same beginning fishermen ar hardened spin fishing fans. But in reality, it's nat that camplicated or expensive, as authars Harman Henkin and Marty Beatty illustrate in this issue's recreatian guide. See page 23. Back cover phata af fly fishing on the Stillwater River by Mike Sample.

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a livable environment for WILDLIFE is a quality environment for MAN

WHAT WE CAN DO FOR THE GRIZZLY

In the last year I have spent a lot of time discussing, debating and studying the needs of the grizzly bear and the best course to follow if the grizzly is going to maintain its present status as a part of our wildlife heritage.

On one hand we have the people who sincerely believe that the best thing for the bear is to just go away and leave him alone. On the other side we have the equally sincere individuals who want the bear managed as any other wild population, including sport hunting of individuals determined to be surplus to the survival needs of the population.

There is, at the moment, one area of agreement. Everyone seems to agree that we need additional information to intensively manage the populations and that until the data is available, a go-slow approach should be taken. Accordingly, the Fish and Game Commission has declared a two-year moratorium on grizzly hunting in the Yellowstone ecosystem and established a take-by-any-means limit of no more than 25 grizzlies in the Flathead-Sun River area (Bob Marshall ecosystem). We are taking the lead in an intensive grizzly research project in northwestern Montana in cooperation with the University of Montana, U.S. Forest Service, National Park Service, U.S. Fish and Wildlife Service, Canadian Forest Service and the provinces of British Columbia and Alberta.

In the meantime, the U.S. Fish and Wildlife Service has published a notice of proposed rule making in the Federal Register that, if adopted, would place the grizzly on a threatened list in the lower 48 states.

We have resisted this proposed federal take-over of state jurisdiction and management of a resident wildlife species and shall continue to insist that the grizzly will fare better under state control.

Wes Woodgerd

Wes Woodgerd, Director
Department of Fish and Game

THE GRIZZLY

If the wild grizzly disappears, hopefully people will remember what was said here.

by Bill Schneider

EVERYONE has experiences that stick for life—those precious moments, often recalled, and becoming more meaningful as years hurry by. So it is with my first encounter with the King of the American Wilderness.

In 1967, I was working part-time on trail maintenance in the backcountry of Glacier National Park. That particular morning seemed routine, a good breakfast before heading out to clear downfall from hiking trails. After several miles, my companion and I came to a wild mountain stream, rushing bankful with snowmelt. My partner stopped for a cold drink and joked as I almost fell while crossing to the opposite bank on a shaky lodgepole, conveniently extending from shore to shore. Having successfully negotiated the makeshift bridge, I also downed a hardhatful of ice cold water, leaned back and drifted into one of those pleasant daydreams that come so easily in pristine places.

After a few moments, I was rudely brought back to reality by my partner frantically pointing upstream. The roar of rushing water stole his words, but he was obviously excited. Peeking over the fallen lodgepole, I saw why. And the movie camera in my mind registered a few seconds for all future daydreams.

There, knee-deep in wild water, was a large female grizzly helping her young cub across the treacherous rapids. Her other cub was already across. Tenderly, the female monarch half carried, half pushed the wee one through the icy torrent. Only 50 yards away, the royal family seemed uncomfortably close. Like most people, I'd heard many campfire yarns about the vicious grizzly.

Then, in a movement almost too fast to follow, mother was on guard. For a second—or maybe just a split second—she stood on her hind legs. The white water splashed against her silver-tipped coat. And she seemed exactly in the right place with her huge hulk silhouetted against the blue sky and towering crags of the northern Livingstone Range. Her nose went up—trying to recapture the foreign scent some tattletale breeze had brought her.

Sensing danger, the bears bolted for the forest on my side of the stream. The speed of their movement blurred the details, so I've always wondered how the cubs forded the stream so quickly when a second earlier they needed mother's help.

After I recovered from this momentary scare, I realized how fortunate I was. How many people would ever see anything like that? Very few, I concluded. Many would see a prideless grizzly in a zoo, but only a handful would ever view the wilderness king in a secluded setting.

Suddenly, I felt sorry for the rest of society. They missed something very important in life, and I was definitely one of the chosen few.

During my four summers at Glacier, I stumbled into a dozen or more grizzlies on backcountry trails. Without exception, the grizzly quickly fled. After awhile, I caught myself wishing the bear wouldn't run right away. I gradually lost my fear of the big bear—my fright slowly replaced by respect, admiration and jealousy. The grizzly became more and more a symbol to me, a spirit that occasionally appeared to remind me that I was an intruder. My infrequent visits to the bear's domain were allowed—or perhaps tolerated—but certainly never appreciated.

The grizzly's presence meant man hadn't messed up this part of the planet. In those remote retreats, the grizzly ruled with a self-assurance matched by few beasts and no men.

In biological circles, the grizzly is known as an inhabitant of wilderness—not necessarily designated wilderness, but areas "wild" in nature with few people and their paraphernalia. Simply stated, this means the great bear requires vast tracts of remote land. Without these wildlands, the hunting and other controversies lack significance.

Montana is indeed fortunate to have some large primitive areas and thus, the ability to house grizzlies. If we can somehow manage to keep these areas in their present condition, Montana will have grizzlies for a long time. Unfortunately, however, there are those who work against such remote regions and thus, against the grizzly. For example:

Can the grizzly survive today's development trends? photo by Mike Sample

• Proposed and existing development in the Gallatin Canyon and Gallatin National Forest—ranging all the way from second home resorts to power lines, roads, logging and sheep grazing, threaten remaining grizzly habitat.

• In the Flathead, coal development and related growth—much of it unplanned, including the possibility of a paved highway, a power line, railroad spur line and second home development, would render a large area of important grizzly habitat adjacent to Glacier Park unusable by grizzlies.

• Continuous timber sales scheduled in west central and northwestern Montana—in the Middle Fork area between Glacier Park and the Bob Marshall, and the Swan and Whitefish ranges—pose a threat to important grizzly habitat.

• Oil and gas lease applications have been filed on approximately 236,000 acres of Flathead National Forest land, with some in the Bob Marshall Wilderness and the proposed Great Bear Wilderness.

And it doesn't stop at Montana's borders. Idaho and Wyoming also have grizzly habitat problems. For example:

• Two regions on the east side of Yellowstone National Park (Sunlight and Needle creeks) which probably support grizzlies, are proposed for copper mining.

• Oil and gas exploration has increased in tempo in Wyoming's Shoshone National Forest adjacent to the park.

• Sheep grazing continues in Idaho's Targhee National Forest, where grizzlies occasionally roam. In just four years, 1970-73, at least 21 "marauding" grizzlies were killed here, because they allegedly interfered with flocks grazing on national forest lands. (Idaho hasn't allowed grizzly hunting since 1947.)

These are merely a few of the problems facing grizzlies and their habitat, and by no means is the list complete. If given enough rein, all of this could mean taps for the grizzly, especially in the Yellowstone area. Many argue that high density, readily accessible recreation and maximum resource use far outweigh grizzly habitat on the list of land use priorities. But regardless of the merits of developing these primitive parts of America, it's the worst possible news for the big bear.

Simply stated, we must maintain our wildlands to maintain the grizzly.

In 1971-73, national concern for the grizzly peaked. The Yellowstone controversy was flaring and many

OLD EPHRAIM'S GRAVE (GRIZZLY BEAR)
KILLED BY FRANK CLARK, MALAD, IDAHO
AUGUST 22, 1923 — WEIGHT APPROXIMATELY
1100 POUNDS.—HEIGHT STANDING 9 FT. 11 IN.
SMITHSONIAN INSTITUTE HAS EPHRAIM'S SKULL

Old Ephraim, the last grizzly in Utah, was trapped and then shot in 1931 for killing domestic livestock. Hopefully, Old Ephraim's fate won't be repeated in Idaho, Montana and Wyoming. photo courtesy of the Utah Division of Wildlife Resources

individuals, citizen groups and scientists predicted extinction for the Yellowstone grizzly. During this furor, the Endangered Species Act of 1973 emerged from Congress.

Soon after its passage, protectionists picked up the public involvement section and started running. On Nov.15, 1974, Fund for Animals, Inc. petitioned the U.S. Department of the Interior to classify the grizzly as "endangered" south of Canada. Game departments, wildlife researchers, some sportsmen and certain individuals, in turn, asked Interior to leave grizzly management to the states. The game departments of Idaho, Wyoming and Montana strongly resented the take-over of states' rights to manage nonmigratory wildlife.

Typically, the federal government tried to please everyone and proposed to classify the grizzly as "threatened" south of Canada. However, this attempt to please everybody pleased nobody—or at best, only a few. The move usurped states' rights, took over grizzly management and stopped hunting—except on a very restricted basis in west central Montana. (The boundaries of the area have not been established by the Departmet of the Interior yet.) And the protectionists claimed Interior "caved in to the trophy hunting lobby," and insisted the bear was "endangered."

(The 1973 act defines "endangered" species as "any species which is in danger of extinction throughout all or a significant portion of its range . . . ." The act defines a "threatened" species as ". . . any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.")

The Endangered Species Act explicitly prohibits public agencies from taking any action (a lease, permit, etc.) that might lessen a threatened species (i.e., grizzly) chances for survival. We've already listed several possible disasters for the grizzly—recreational subdivision, roading, logging, power lines and roads. All of these *require approval by the U.S. Forest Service.*

Apparently, the FS can't approve such developments *if* (1) they disrupt critical grizzly habitat and (2) the federal government classifies the grizzly as "threatened" or "endangered" under the Endangered Species Act.

One of the most distressing parts of the grizzly issue is the lack of bears in what appears to be adequate grizzly habitat—habitat which apparently has all the components needed by grizzlies. Large portions of Montana and other states, such as the Selway-Bitterroot Wilderness in Idaho and Montana, appear to have the ability to house grizzlies, but the bears aren't there. One reason is that *we won't allow it*. Everyone, it seems, wants grizzlies around, but not *around them*. "That bear is okay," we say, "as long as he doesn't bother anyone's recreation or livelihood. Keep grizzlies in the national parks—don't dump them on us."

When anyone suggests transplanting surplus grizzlies to re-establish lost populations, a public uproar follows. Ranchers, recreationists, resort operators, timbermen and others register a resounding protest, and the suggestion is dropped.

Granted, there may be some excellent biological reasons why the Pintlars, Bitterroots and other public lands don't (or can't) support silvertips. But we don't know them.

Wildlife professionals agree we should at least study the feasibility of re-establishing grizzly populations in these remote areas, but they're very cautious about it. "If it's done, it must be done right," they say.

Also, they worry about public reaction, or, as they put it, "level of tolerance." This translates into the harsh reality that people apparently will only tolerate grizzlies in certain places.

When (or if) the wild grizzly disappears, who do you suppose will be blamed? The NPS? The FS? The game departments? The second home developers? The energy companies? The timber industry? Or will we all accept the responsibility because we (1) failed to successfully maintain grizzly habitat, (2) hesitated to investigate the possibilities of introducing the bear into apparently acceptable habitat and (3) refused to convert to less wasteful life styles that conserve natural resources and energy.

One could argue that because of large expanses of wilderness already established—national parks, the Bob Marshall, the Lincoln-Scapegoat—we'll always have grizzlies. Perhaps the bear will disappear in the Missions, Cabinets, the Absaroka, Spanish Peaks, the Madison Range. But at least we will still have a few grizzlies, won't we? Hopefully, yes—but not if human use of these large wildernesses continues unabated. But the grizzly story doesn't end here. It goes on—right to what makes Montana Montana.

Why do we live in Montana? Many of us don't reside here because of high salaries, easy employment or other economic opportunities.

No. Most of us live here because of clean air and water, scenic grandeur, abundant wildlife, outdoor opportunities and uncrowded living conditions. In short, we sacrifice financial prosperity for a quality life.

Granted, we all have to make a living—but most of us are willing to make some economic sacrifices just to live in this state.

This umbilical cord-like link with Montana is difficult to put into words. It comes down to "quality of life." This is what brings us here, keeps us here and when we leave,what continually coaxes us to return.

This "quality of life" is catching a native cutthroat, seeing grouse strut on their traditional "dancing" grounds or hearing an angry squirrel split the forest's stillness. It's hunting, fishing, ski touring, hiking, biking and snowshoeing from the front door. It's the chinook winds, a horizon free of pollution plumes, an uncrowded campground and people working on the land.

It's a 300-mile segment of America's backbone, the Continental Divide—those punishing peaks that send

continued

In the Yellowstone Park area, grizzlies feed on elk and other things in the spring. Although grizzlies occasionally kill elk, they more often feed on animals that have died of malnutrition during the winter. photo by Mike Sample

flashing waters seaward to green forests on both slopes and, in time, nourish the eastern plains. It's singing streams thawing the anglers' veins in spring, flower blankets luring families to the highlands in summer, the majestic elk trumpeting hunters to the field in fall and unmarked snow fields enticing those who relish solitude in winter.

It's the incredible vistas, the beauty of too much sky, the perfection of bitterroot petals and the coyote's midnight serenade. It's the cloud-brushing crags, the grass oceans, the gem-like lakes and the free rivers—all crowned with a dome of purest blue.

It's the grizzly bear.

It stands to reason that the state with the most grizzlies (Montana, excluding Alaska) has felt technology's trends the least. True, civilization has come to Montana, but it hasn't gone mad—not yet anyway.

This is why Montana has cutthroat trout, open space, clean air and rural life styles. This is why Montana has grizzly bears. And this is why we like to live here.

What will the grizzly's disappearance mean to Montana? Will it mean we've lost the plumeless horizons, the free rivers, the elbow room? Will it mean resource abuse prevailed and conservation efforts collapsed? Will it mean Montana has become a recreational city, America's second home, a giant part-time bedroom and playground for the affluent? Will it mean Montana has taken an irreversible step in Colorado's or California's footsteps—committed to full-blown growth, with no chance to remove the blinders?

Will it mean we won't be able to keep Montana Montana—that we tried to do something different here, but failed?

All wildlife acts as an indicator of a quality environment for man. As wildlife habitat disappears, human habitat becomes a little less livable—and certainly less desirable.

This is especially true in the grizzly's case. If the bear continues as a component of Montana's wildlands—indeed, if we can maintain these wildlands and their irreplaceable component of wildlife and wildlife habitat—our enjoyment of the "quality life" will continue. And we will have kept something very vital for unborn generations.

The Sept./Oct. 1975 issue will contain the department's position on grizzly hunting and details on our management plans and objectives. We had originally intended to include this information along with this article. But at press time, the federal government still hadn't decided what to do about the proposed "threatened" status for the grizzly. Since this decision will affect management plans, we were forced to hold this information until next time.—Ed.

SEPTEMBER 27, 1975

you can't keep a good idea down

by Bill Pryor

Telling a Montanan that hunting and fishing are important is sort of like telling a logger that trees are important. "So, what else is new?" comes the reply. Elsewhere in the U.S. people aren't so sure, and that's the reason for National Hunting and Fishing Day.

The Treasure State is a treasure chest of wildlife for hunting and fishing. It is easy for a sportsman to hunt and fish here. If an anti-hunting grumble finds its way into a local newspaper, we read it with a yawn. In other states, pressure builds and hands tremble when hunters and fishermen read they are causing wildlife's demise. National Hunting and Fishing Day will help cure that misconception.

Should Montanans be concerned about such talk? Perhaps we're far enough removed from all the behind-the-back talk about hunters and fishermen. Then again, maybe we're not.

When federal agencies in Washington, D.C. adjust weights and measures, western wildlife feels the change of balance. Witness the increasing pressure exerted on the Department of the Interior by opponents of hunting and fishing. One recent result is reduced grizzly bear hunting. The grizzly may be placed on the "threatened" wildlife list by Interior, even though biological evidence indicates otherwise. Regulations allow a harvest of 25 in Montana this year, and this quota must include marauders killed for molesting private property and livestock. (An average of 22 marauders is dispatched annually, leaving 3 grizzlies for hunters.)

Maybe Montana isn't as far-removed from the anti-hunting grumbles as we'd like to think. On Saturday, Sept. 27, perhaps we should take a day away from busy hunting and fishing schedules and join ranks with sportsmen across the U.S. to celebrate the fourth annual National Hunting and Fishing Day.

It all began with Ira Joffe, owner of Joffe's Gun Shop in Upper Darby, Penn., who decided sportsmen should have a day set aside to recognize their contributions to conservation. Joffe's ultimate goal was a national celebration. The Pennsylvania Federation of Sportsmen's Clubs thought Joffe had a good idea, so a member who was also a legislator took the idea to the capital of Harrisburg. In 1970, the governor proclaimed Outdoor Sportsmen's Day in the Quaker State.

The idea grew and in 1971 a recognition day called Pennsylvania Sportsmen's Day was proclaimed.

The seed of an idea planted in Joffe's Gun Shop moved on to Washington, D.C. Congressional Records for January and July of 1972 note two resolutions voted on by both houses of Congress asking ". . . the President of the United States to declare the fourth Saturday of each September as 'National Hunting and Fishing Day'." Sen. Thomas McIntyre (D-New Hampshire) and Rep. Bob Sikes (D-Florida) introduced the resolutions, they were signed by the President in May and Ira Joffe's dream became reality on Sept. 23, 1972.

National, regional, state and local organizations payed tribute to the nation's 55 million hunters and fishermen that autumn. All 50 governors proclaimed a state day of recognition. Some 3,000 sportsmen's clubs opened their doors to the public. Many yarns and tall tales were passed around that day, but something more important happened. The sportsman became a recognizable face in his community and the story of his work for wildlife was told to 4 million persons on that first National Hunting and Fishing Day.

continued

Sportsmen have aided various and diverse wildlife causes over the years. Commercial resale of slaughtered game was stopped early in this century with help from sportsmen. Fish and game departments were organized across the country through urgings of hunters and fishermen. In 1937, sportsmen lobbied for, and secured the passage of, the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act). Sporting arms and ammunition are taxed 11% and approximately $44 million raised annually is returned to individual states for wildlife conservation work. Companion legislation, the Federal Aid in Fish Restoration Act (Dingell-Johnson Act) taxes fishing tackle purchases to the tune of $15 million annually for fisheries work in the 50 states. Again, conservationist, hunters and fishermen introduced and supported the laws which tax the wares of their sport.

Since the 1920s, over $5 billion has been paid out for hunting and fishing licenses, taxes and waterfowl stamps. Each year another $165 million is added.

Many persons incorrectly assume that huntable game animals and catchable fish are the sole beneficiaries of sportsmen's money and concern. They mistakenly believe wildlife managers can place a protective arm around the shoulders of deer, elk, grouse and trout while leaving marmots, hawks, snakes and salamanders to the whims of fickle fate. However, since both groups live in the same areas, both game and nongame animals alike benefit from management.

In fact, Montana sportsmen even support a program of management and information on nongame animals. Hunters and fishermen long ago realized that all parts of the outdoors must be healthy for any one part to thrive. All animals in the forest, field and stream benefit from conservation concern.

Montana participated in that first year salute to sportsmen and even added a special twist. The Fish and Game Commission decreed that NHF Day should also recognize those who do so much to make hunting and fishing possible —the landowners. So, personnel from each of Montana's seven fish and game regions submitted names of landowners who tried unselfishly to promote good feeling and understanding between sportsmen and landowners.

"The problem we had that first year was picking just seven people from the many who deserved the Landowner-Sportsman award," noted Steve Bayless, department information chief, who organized the first presentations.

"We made the choices and presented framed pictures of Montana wildlife to the winners on NHF Day, 1972. A plaque on the frame reads, 'In Recognition of Your Contribution to Understanding and Cooperation between Landowners and Sportsmen in Montana'." As the years go by, many other helpful landowners will be recognized.

Learning and then passing on the true story of the sportsman's role in American conservation—an excellent scout project for National Hunting and Fishing Day. photo courtesy of the National Shooting Sports Foundation

EDUCATING THE UNINITIATED

As we approach the fourth NHF Day, sportsmen can look with pride at what this day has become.

In 1972, most of the programs were conducted in rod and gun and sportsmen's clubs. Visitors met outdoorsmen, children learned how to cast, shoot a bow and arrow and something about the habits of game animals.

"An effort had to be made by people to come out to the clubs, and that's not without its advantages," said Bob Delfay, national coordinator for NHF Day for the National Shooting Sports Foundation. "Clubs offer room for the more flamboyant activities like trap shooting and field dog maneuvers which visitors enjoy. Not to mention the chance to sign up new members for the club.

"Three-quarters of the U.S. population don't hunt or fish and do not understand why others do. After that first NHF Day sportsmen felt they could better explain what conservation means if they took the celebration to the uncommitted millions. They decided to

go to the shopping centers," Delfay continued.

Shopping centers across the country resembled an outdoor sports show for the second NHF Day in 1973. A man headed for the drug store stopped at one of the many booths to talk to a Ducks Unlimited club member about water conditions for mallard and gadwall in Saskatchewan and Manitoba. Children asked sportsmen for the names of the fish swimming in the aquarium at the display table. A woman found out that it's the deviate slob hunter who decorates country stop signs with blasts from his shotgun, not the courteous sportswoman who gave her the wild game cookbook. Some 14 million persons participated that second year.

In 1974 the total number of persons involved climbed to 20 million, and the variety of programs was limited only by the sportsmen's imagination. Hunting and fishing booths, demonstrations and learning centers were set up in 450 shopping centers across the country, where a family could get not only a pair of new shoes but also a lesson in conservation.

In Anaheim, Calif., two city blocks were roped off to make room for exhibits and instruction. The Indian Trail Club of St. Clair, Mo., received permission from the city police to place NHF Day stickers on every parking meter in town. In Chicago, members of Salmon Unlimited received extensive newspaper publicity for Conducting an NHF Day cleanup of a local lagoon, filling five city garbage trucks with river rubbish.

First rate publicity for the fishing and hunting fraternity has drenched the pages of newspapers and filled hours of air time on major television networks. When a man in Vincennes, Ind., watched the evening news, he saw his neighbor down the street explaining to the broadcaster how the rod and gun club helped the Indiana Department of Conservation install wood duck nest boxes. He turned to his wife and said, "I didn't know that." Beaming hunting and fishing benefits into the

Young hunters and anglers learn early that their license money benefits game and nongame wildlife. Facts like this are brought out at National Hunting and Fishing Day observances. F&G photo by Bill Pryor

houses of nonsportsmen has helped enlarge their knowledge.

You can't keep a good idea down. The NHF Day concept escaped our shores and cropped up in Heidelberg, Germany. Brescia, Italy sponsored "Giornata del Cacciatore e del Pescatore." Roughly translated that reads "Day of the Hunter and of the Fisherman," with tomato sauce.

Montana rod and gun clubs have sponsored projects across the state for the past three NHF Days, some in shopping centers. Regional fish and game headquarters sponsored open houses and featured wildlife demonstrations and movies.

Many folks, especially in a wildlife-blessed state like Montana, wonder why NHF Day falls in September. Hunting seasons are just beginning, fishing is at its peak and a self-respecting sportsman should be afield, not wearing out his boots on the hard floor of some shopping center.

"The date was originally chosen because sponsors thought hunters and fishermen would have the outdoors foremost on their minds when the frost of fall is approaching," answered Delfay. "It's a time when good fishing and hunting days overlap, a sportsman's interest is keenest and he will be primed with a religious zeal to make conservation converts out of the uninitiated."

But questions about the date have not gone unnoticed and Delfay says the day might be

continued

moved to August sometime in the future.

WHERE TO FROM HERE?

If you spend time outdoors and believe there's value in your recreation, why not tell others about it this Sept. 27th?

A 64-page how-to booklet, "National Hunting and Fishing Day Action Manual," is available for $2 from the National Shooting Sports Foundation, 1075 Post Road; Riverside, CT 06878. Bumper stickers, badges and fact sheets are also available.

The manual offers valuable hints—from the first planning meeting to the Sunday after cleanup:

- Open the program at 9 a.m. and close down at 4 p.m.
- Interest various conservation groups, such as Audubon Society, Trout Unlimited and ecology classes from the local high school or college.
- Organize an agenda to keep the curious nonsportsman's interest and expand his knowledge.
- Establish a steering committee to handle various parts of the program.
- Ask the mayor to proclaim Hunting and Fishing day. You might even supply him with a suggested announcement.
- Order hand-out literature early from your fish and game department, federal bureaus, Ducks Unlimited, Trout Unlimited, etc.
- Invite the local press.
- Whether your club holds a celebration on the club grounds or at a shopping center, begin planning early.

"Every club's NHF Day program reflects that club's interests," notes Delfay. "Sportsmen on the seacoast tell people about salt water fishing. Midwest clubs talk about harvesting upland game and explain how the birds keep replenishing their numbers year after year." In Montana a sportsman's club is hard pressed to pick just one aspect of conservation to talk about. That's the price for living in the number one wildlife producing state in America.

MINI-EDITORIAL

This article explains National Hunting and Fishing Day, its potential, how to celebrate it and the reasons behind it. However, one additional point should be emphasized. It's also a golden opportunity to tell the world that wildlife is in trouble.

Land use activities—mining, rural subdivision, energy development, stream alteration, pesticide misuse, dam building, dewatering, etc.—threaten fish and wildlife habitat on many fronts. Unfortunately, it sometimes seems like the sportsman who enjoys fish and wildlife so much is apathetic about the threats to his sport and to his surroundings, in general.

Without hard-nosed protection of vital habitat, Montana won't have harvestable fish and wildlife populations. And in turn, hunting and fishing may disappear or be greatly restricted as popular pastimes.

The most thorough NHF Day education occurs in the eastern cities and states. The largest number of celebrations annually occurs in New York, with Pennsylvania and Ohio battling for second. Colorado leads the western states.

But once the sportsman has the attention of that uncommitted mass of people called the public, he can explain his case. This year 50 regional finalists in the Miss Teen Age America competition will give air gun shooting demonstrations at NHF Day programs in their areas. That's P.T. Barnum showmanship you say, but the demonstrations will attract attention, and that's a first step in education.

The other side is trying to win the public over to the anti-sportsmen's camp. Those interests accuse sportsmen of caring nothing for animals and treating them viciously. To hunt or fish are choices an individual makes for himself. The moral rightness of the choice must be decided in each person's mind. It's impossible to prove that either side is 100% right. So, the sportsman and the anti-sportsman are left, squared off with one another emotionally, each claiming that his point of view is correct.

But emotion shouldn't hide the story of the sportsman's accomplishments. Because sportsmen have cared over the past century, several species of animals are alive today which otherwise would have been extinct. When those men in hip boots and canvas coats were busy saving animal species, where were the predecessors of the anti-sportsmen groups?

Hunters and fishermen have done much to conserve wildlife. In Montana, they have been so successful that they may be complacent about anti-hunting forces. But don't be fooled. They can reach Montana. To combat them you might offer your support to National Hunting and Fishing Day, 1975—our newest sporting tradition.

* * *

Past recipients of the department's "Landowner of the Year" award include:

- —Kalispell Region—1972, Paul K. Harlow, Thompson Falls, and Burlington Northern Railroad; 1973, Roger Taylor, Somers; 1974, St. Regis Paper Co., Libby
- —Missoula Region—1973, Anaconda Co.; 1974, U.S. Plywood, Thompson Falls
- —Bozeman Region—1972, Hans Anderson, Dillon; 1973, Sun Ranch, Ennis; 1974, J. Stanley Milesnick, Belgrade
- —Great Falls Region—1972, Kolar Brothers, Geyser; 1973, John Baucus, Helena; 1974, Chester French, Helena
- —Billings Region—1972, Herb Huennekens, Billings, and Clarence Pile, Greycliff; 1973, Tom Frost, Nye; 1974, Mary and Clay Donahoe, Nye
- —Glasgow Region—1972, Eldon Barnard, Malta and Connie Cox, Saco; 1973, Warren Ross, Chinook; 1974, Lyle Nelson, McCone County
- —Miles City Region—1972, John Wegner, Volberg; 1973, Frank Sparks, Plevna; 1974, Don Hartman, Miles City

Lake Mary Ronan

—where the public interest comes first

by Bill Schneider

"I've known since 1952 that the lake was in jeopardy from eutrophication. I'm concerned about that. Do you think I'd spend a quarter of a million dollars if I wanted to see that lake die? I want to help the lake."

With those remarks, land developer Sam Eastman started the public hearing. He was speaking to a roomful of concerned local residents and county officials.

"I'm just as interested in keeping that lake alive as any person here," Eastman assured. "From the bottom of my heart, this lake is precious to me."

But unknown to Eastman, a growing uneasiness had spread throughout the community concerning his development plans. Citizens were hearing some things that worried them—namely that the resource they enjoyed and/or depended on for economic livelihood, Lake Mary Ronan, could deteriorate unless some decisions were quickly made. The Department of Fish and Game was also deeply concerned because of the lake's value to fishermen. In fact, on an acre-by-acre basis, Lake Mary Ronan receives more fisherman use than any other lake in northwestern Montana—and not just from local residents. The lake attracts anglers statewide.

At issue was the proposed Western Sunset Development, a 172-acre condominium complex with associated commercial and recreational facilities on the shores of Lake Mary Ronan, 23 miles northwest of Polson. Eastman, a former Lake Mary Ronan resident now living and developing land in Hawaii, proposed this development.

The developer's attorney had first notified the Lake County Planning Board of the plan on Aug. 14, 1974. Responding to a question at that pre-application hearing, the population of the 12.3-acre lakeshore lot was estimated at "20 or so" people, according to the meeting's minutes.

On Oct. 29, 1974, Lake County Planner Dave Erickson received the preliminary plat. At that time, the developer wanted to file site plans only for the 12.3-acre lakeshore lot and one other 14-acre lot, according to Erickson, and in turn, receive blanket approval for the remainder of the recreational subdivision, effectively avoiding public input or regulation for the majority of the development. However, this idea was discouraged and shortly dropped. On Nov. 13, 1974, the plat was officially presented to the Lake County Planning Board.

During all this preliminary activity, news of the second home subdivision filtered down to most Lake County residents. To those living at Lake Mary Ronan, it was alarming.

What upset local residents most was the high density. In fact, the 12.3-acre lakeshore lot alone was planned to accommodate 325-375 persons at capacity—considerably more than "20 or so." And all 14 lots in the development together could support 3,000 residents. Considering that only about 200 persons now live in the entire watershed, this was understandably shocking.

On Dec. 5, 1974, the Department of Health and Environmental Sciences released a well-researched environmental impact statement (EIS) on the project. The statement contained a wealth of information that at least partly confirmed the fears of local citizens. Admittedly, such statements rarely make the best-seller list, but this one quickly became popular. In fact, Wilbur O. Aikin, the statement's author, had more requests for it than any other statement he has written—and he's ground out several hundred. After reading this, people were really primed for the public hearing which finally came on Dec. 13, 1974.

So the stage was set that night when Eastman presented a development proposal and slide show. Even when the developer said he would do everything required to protect the lake, people remained wary.

When the public's turn came, resident after resident raised specters of ruined wildlife range, degraded water, overcrowding, energy extravagance, hundreds of large power boats, noise pollution, fire danger, overfishing, irrigation problems, ground water contamination, uncontrolled snowmobiles and dirt bikes and, in general, unwanted environmental disruption.

Leland Schoonover, Polson resident summed up public sentiment by saying, "I feel that when the degradation possibilities are analyzed carefully and the results weighed properly, the environmental damage will far outweigh the economic benefits that might result."

A local realtor stood up and emphasized the high density. He implied that if the county approved this one, they would be hard pressed to refuse the next high density development on the lake.

After about two hours of discussion and testimony by local residents, Polson Outdoors, Inc. (a local sportsman's group), Flathead Tomorrow (a group working for better land and water use in northwestern Montana), the Department of Fish and Game and a

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few others, the town meeting ended. That night, all of the official testimony —except one local resident and the developer—questioned the development's merits. And the commissioners, planning board and developers seemed surprised at the amount of public concern.

Then, the planning board and planner Erickson went to work trying to figure their forthcoming recommendation to the commissioners. Normally, the board recommends approval, conditional approval or denial. And the commissioners accept, deny or modify that recommendation.

But this time it was different.

They had received plenty of suggestions at the hearing, but an additional 27 letters came in from citizens, clubs and agencies—more comments than any other single development had ever generated. The comments ran about 10 to 1 against the development, according to Erickson.

Steve Granzow, subdivision specialist for the State Department of Intergovernmental Relations, suggested the high density lakeshore lot be left as a public park and the remaining land (away from the lake) be approved for development.

William L. Pederson, speaking for the U.S. Forest Service, worried about extra recreational use of nearby National Forest land. "Speaking for the National Forest lands in the area, present management direction is aimed towards timber management, with dispersed types of recreation," Pederson wrote. "A recreational development of the magnitude proposed could create demands on the National Forest lands which are not in accordance with the present management direction."

Representing the State Department of Natural Resources and Conservation, William P. Cunningham identified Western Sunset as a good example of a broader problem—the lack of long-range growth policies. "There is a critical need to formulate long-range growth and land use goals so that a broader perspective can be applied to individual subdivision assessment."

Cunningham also noted, "In this instance, the subdivision is not designed to satisfy essential housing needs. It is but another example of energy-intensive second-home development strategically located near scenic land and water features."

He also reminded Erickson that during a recent land use workshop survey, 80% and 72% of Missoula and Kalispell respondents, respectively, agreed there was already too much land subdivision in Montana's rural areas.

Department of Fish and Game spokesman Otis Robbins, warned that (1) the site was critical winter range for white-tailed deer, (2) the lake couldn't accommodate the additional nutrient load the development would generate without losing its salmon and trout fishery and (3) the Lake Mary Ronan Recreation Area bordered the project.

"Because of the potential recreational loss of Lake Mary Ronan as an outstanding fishery, accelerated eutrophication of the lake, overuse of the recreational resources, loss of deer winter range and deterioration of water quality," Robbins concluded, "we recommend that this development be denied."

By far, the most frequent concern expressed by local residents was the rapid eutrophication of the lake, a process which would be speeded up by Western Sunset.

(Eutrophication is a natural process whereby a lake gradually becomes a meadow. The lake "ages" as cold, clear water is "enriched" by the addition of nutrients. In the process, the lake goes from a cold water fishery [trout and salmon] to a warm water fishery [northern pike, bass and perch] to a rough fish paradise [carp and suckers] to an algae-choked condition supporting little animal life or until, in time, the lake "disappears." For details on the eutrophication process, see Loren Bahls' article on page 14.)

While checking on this point, county officials turned up some red flags. Perhaps the most alarming information came from a recent research project completed by Dr. Lawrence Sonstelie, chairman of the Natural Science Division at Flathead Valley Community College. His study revealed that Lake Mary Ronan has reached "an advanced stage of eutrophication" with algal blooms already present. In concluding his report, Sonstelie forcefully stated, "At the rate eutrophication is progressing in this lake it will probably be septic at some time during the next 10-20 years." ("Septic" means "poisoned" or "putrefying" or "void of oxygen.")

Dr. Sonstelie remarked in a later conversation, "It's not even a question of the lake being able to accept more nutrients; it can't stand the load it is now receiving."

He also said the "distinct and foul-smelling odor associated with the fall algal bloom was H_2S (hydrogen sulfide) which in ample concentrations is toxic to fish.

John F. Tibbs, director of the University of Montana Biological Station at Yellow Bay, said approval of Western Sunset held "the gravest implications for the future of the lake." He said the lake water already exceeded state safe drinking water standards (except in the middle of the lake) and certain areas along the shore weren't safe for swimming.

The EIS also contained some scary information. "The gravity of the problem became apparent as late as 1969, 1970, and 1971 when oxygen depletion conditions at depth coupled with high temperatures on the surface compressed the fresh water fishes (particularly Kokanee Salmon) into a thermocline zone that narrowed from 2 to 4 feet. At one time during this period the 'livable' region for such fish was less than 12 inches thick. A massive fish kill was very narrowly averted and even without broad spectrum water chemistry data it was apparent that this condition was a reflection of grossly deteriorating water quality in the lake."

What was causing this rapid aquatic degradation? Actually, no single factor can be blamed. Instead, several poorly regulated land uses combined with natural conditions to magnify the problem.

First, eutrophication is a *natural* process. But human activity "speeds up" the process. Lake Mary Ronan is especially vulnerable because of the local topography—a small watershed (32 square miles) and a slow exchange of water in the lake. In other words, little water enters or leaves the lake. This makes Lake Mary Ronan a very effective "nutrient trap" and prone to serious eutrophication problems.

Even with this unfortunate natural situation, the lake surely wouldn't become septic for a very long time if man wasn't there to contribute to the nutrient supply. Cattle grazing along the shore and inlets, logging in the watershed, subdivision development and cabin sites, a state recreation area along the shore and, in general, heavy human use of the area all contribute to the "enriching" of Lake Mary Ronan.

Realizing this, Aikin wrote in the EIS, "Cumulatively, all of these abuses and practices have created a water quality problem which may make it difficult to utilize the lakeshore for extensive residential purposes despite the fact that plans for all kinds of waste disposal from new projects could and would meet and exceed State Department of Health regulations and standards."

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With this economic and environmental disaster looming on the horizon, the planning board broke away from standard procedure. On Jan. 3, 1975, the board recommended that the county commissioners ask "the subdivider to withdraw his application."

In its letter, the planning board wrote, "In conjunction with this action the Planning Board recommends that the Governing Body [the Commission] adopt an Interim Zoning Resolution for the Lake Mary Ronan watershed . . .", specifying "that current land uses in the watershed be locked into present status and pattern, that subdivision of land be prohibited, that division of land other than subdivision be subject to review and approval by the county commissioners and all structural development and/or land use changes within the district be subject to review and approval by the county commissioners." The review process entailed channeling a proposed project through a zoning commission which, in turn, made recommendations to the commissioners.

"The Planning Board sincerely believes this emergency action is necessary in order to adequately deal with the very critical and potentially tragic situation found in the Lake Mary Ronan area," the board continued. "The entire watershed has to be very comprehensively planned if the current situation is to be remedied, or at least not aggravated, and it requires time in order to formulate such a plan."

Erickson summed up the planning board's views by stating, "The recommendation was not aimed at Western Sunset. It was aimed at a critical situation that became evident in the review of that subdivision."

Citing their responsibilities to (1) "maintain and improve a clean and healthful environment in Montana for present and future generations; (2) to promote the public health, safety, and general welfare . . . to prevent overcrowding . . . to encourage development in harmony with natural environment; and (3) to deny approval of subdivisions for building purposes in areas where natural conditions present potential hazards to the public safety and health," the commissioners accepted the planning board's recommendations.

"The Board of County Commissioners is prepared to disapprove the Western Sunset subdivision plat;" the board wrote to Eastman, "however, in this particular case, the Board wishes to first provide you the opportunity to quietly withdraw your application if this would be of any benefit to you—if not, you leave the Board no other choice."

Eastman—through his attorney—refused to withdraw, citing economic hardship as justification and implying he would lose a valuable liquor license if something wasn't approved.

However, according to Tom Mulholland, license bureau chief for the State Liquor Division, the license wasn't in serious jeopardy. Although the division was concerned about inactive licenses, he said they would grant several additional 90-day extensions as long as Eastman was making a genuine effort to use the permit.

Shortly thereafter, the commission officially denied the subdivision and unanimously passed the interim zoning resolution which prohibited further subdivision and brought all structural development under public review for a period of one year, or until a comprehensive study was completed. (The resolution could be extended for one more year.) Determined, though, the developer appealed to the commissioners to reconsider by suggesting a plan with drastically reduced density on the 160-acre tract. (But he still wanted a high density development on the lakeshore lot.)

But on Feb. 7, 1975, the county commission said "no" again. "It is most unfortunate that this decision may cause you an additional financial burden. However, there can be no doubt that the legislation [state land use planning legislation] intended to give to people the authority to maintain a quality of life in their community. If in the exercise of that power a conflict develops it seems obvious that the public interest must come first."

After this action, Lake County Commissioner Al Meyers told MO that "the fragile nature of the lake that is already faced with almost insurmountable problems," and a severe lack of time made "interim zoning the most acceptable alternative."

Referring to the appeal for conditional approval, Meyers said "less density was better, but who was to say what the correct density should be. First, we need time."

Meyers also said the commissioners had expected a legal challenge to the resolution. But at press time, no such suit had resulted. Commendably, the county commission followed through with the planning board's recommendations—*put the public interest first*—even though they thought they would end up in court for it.

One could end the story here. But an unrelated Montana Supreme Court decision changed things.

A few days after Lake County had adopted the emergency interim zoning resolution, the Supreme Court ruled (Bryant Development Assn. vs. Ted Dagel, et al.) that this procedure for adopting emergency zoning wasn't legal. So to legalize the interim zoning resolution, the county had to go through the complete procedure to implement any zoning restrictions—including public hearings and an opportunity for the landowners in the affected area to protest the action. The resolution would go into effect unless 40% of the landowners protested.

In this case, 128 landowners resided in the area, so 52 signatures were needed to defeat the zoning. And the developer pulled out all the stops to get that 40%. He called from Hawaii and discussed the situation with locals for 45 minutes at a time. In form letters, he told them the zoning resolution "confiscated" their property, destroyed their land values and prevented them from doing anything with their land if it was not yet developed. None of this was true, according to Erickson.

The comments were coming in 3 to 1 in favor of the resolution, Erickson reported. As a last stand, however, Eastman flew back from Hawaii and spent days strongly urging landowners to change their minds. And change their minds he did. After reviewing the petition, it was obvious that over 40% of the landowners signed *against* the zoning resolution. Time and time again, landowners who originally voted in favor of the zoning changed their votes to oppose the zone, and the changed vote always had the stipulation added: "This vote supersedes the 'yes' vote we sent to Mr. Erickson's office." As a result, the landowner's voting record switched from 75% in favor to 60% against the resolution, and the zoning resolution designed to protect the interests of the majority of landowners failed.

The county commissioners and the planning board acted on behalf of the public interest as expressed by citizens in public hearings and personal correspondence, and by knowledgeable professionals after review of the situation.

All plans for Western Sunset had been dropped. So in whose interest was Eastman acting?

Also, why didn't the developer accept the expression of public concern and wait for the comprehensive plan to help him instead of expending so much energy to defeat the resolution?

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on the care and feeding of lakes

by Loren Bahls

IT'S spring in the Flathead. The broad muddy river discharges tons of suspended sediment into the deep blue waters of Flathead Lake, depositing a five-inch layer of silt on the bottom. And the river delivers a more insidious cargo: invisible but potent nutrients—phosphorus and nitrogen—that can turn the lake green with algae.

The nutrients and sediment come from many sources along the river's course, from the clearcut a hundred miles upstream to the city sewage discharge just a few miles from its mouth. In between, the river accumulates a heavy burden of soil and chemicals from subdivisions, mining scars, road cuts, stream alterations, livestock and fertilizers. These are added to discharges from natural or background sources.

The lake is a trap. As the sediment arrives, it settles to the bottom. Nutrients are absorbed by living creatures, cycled within the lake's ecosystem, and the lake is enriched. But sometimes it's over-enriched with nutrients. Upstream uses and abuses take their toll, not only on the land but also on the lake downstream. The buck stops here.

On a smaller scale, this scene is repeated each spring in all Montana lakes. Each grain of soil, each molecule of phosphorus and nitrogen ticks off another second in the life of the lake. The lake bottom rises to meet the surface; the water blooms with algae. It is the beginning of the end: The process is called eutrophication.

THE LIVING LAKE

Considering a lake as a living organism is useful in understanding eutrophication. A lake breathes by exchanging gases—oxygen and carbon dioxide—with the air. It feeds on nutrients carried in by tributaries. It excretes waste products into the outlet stream or more commonly deposits them on the lake bottom. Every lake goes through a period of youth, maturity and old age and each stage has its own characteristics.

A lake has a finite life span, measured in seconds on the geologic clock. Many Montana lakes were created a scant 100 centuries ago when the last glaciers of the ice age scoured the northern and western valleys. Some of the smaller lakes already have been filled with silt and choked by weeds. We don't call them lakes today. They are bogs, swamps, ponds and marshes. Until recently, the blame fell only on natural processes of erosion, sedimentation and biological growth.

The rate at which lakes fill and live depends on a variety of factors including the lake's depth, the area of the watershed compared to the area of the lake's surface, climate, sediment loads of incoming streams and the natural fertility of the lake's drainage basin.

EUTROPHICATION DEFINED

Three characteristics indicate a eutrophic lake:

- Eutrophic means "too well fed." In a youthful lake, nutrients (plant foods) are in short supply so biological growth is checked. As a lake grows older, it traps and accumulates more and more nutrients until they are no longer limiting to the plants that require them. As a result, the lake blooms with floating mats of algae or rooted aquatic plants, the first common characteristic of a eutrophic lake. Such a lake looks like pea soup, an appearance caused by concentrations of blue-green algae. These microscopic plants often are avoided by fish and lower aquatic animals. If they are not consumed, the plants represent a dead end—a final link in the aquatic food chain.

- Whatever grows in a lake and is not eaten must eventually die and decay. While plant growth (photosynthesis) *generates* oxygen, the process of decay *consumes* oxygen dissolved in the water. Both growth and decay are intensified in a eutrophic lake. Often the balance between the two is upset, and more oxygen is consumed by rooted plants and algae than is produced. This results in oxygen deficiency (anoxia), the second common characteristic of a eutrophic lake.

- Fish—especially trout—require ample oxygen in the water. Lack of oxygen either under the ice in winter or in the cool bottom waters of a thermally stratified lake in summer, may cause extensive fish kills. This is the third and most critical sign that a lake has become eutrophic.

CULTURAL EUTROPHICATION

Cultural or accelerated eutrophication is the unnatural over-nourishment of a lake due to human or

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cultural activities. The eutrophication game and its rules are still the same, but now a new player is added—affluent, technological man. His influence drastically speeds up the eutrophication process.

In Montana, cultural eutrophication today stems from many sources. It starts at home, in the toilet, sink and washing machine. It starts in the woods with chain saw and bulldozer. It starts on the farm and ranch with feedlots, overloaded ranges and fertilizers. And it even starts with dam and highway builders. Where does it all end? Inevitably, in the recipient and mirror of all land abuses: a lake.

It is tempting to say that eutrophication results in the death of a lake, but here the analogy with a living organism breaks down. A eutrophic lake is livelier than ever before—it's really hopping. It produces more pounds per acre of plants and animals, including fish, than at any time in its existence. "Extinction" or "succession" are probably more accurate descriptions of eutrophication's biological effects than "death."

But the useful life span of a eutrophic lake is all but over. Unsightly algal blooms make the water unattractive for swimming or water sports. Fishing is no longer what it used to be and carp and suckers replace trout and pike. Other forms of life, tolerant of low oxygen levels and higher temperatures, take over—roundworms and bloodworms instead of mayflies and caddisflies, blue-green algae instead of forms more palatable to aquatic animals. The water tastes and smells musty and is no longer drinkable without expensive treatment. The eutrophic lake, for all of man's intents and purposes, is "dead."

CURRENT STUDIES

Noticeable sign of natural or cultural eutrophy has been pinpointed in 24 of the 500 significant publicly owned lakes in Montana, according to the Water Quality Bureau of the Department of Health and Environmental Sciences. This list includes such popular lakes and reservoirs as Placid, Seeley, Salmon, Foy, Lake Mary Ronan, Island, Rogers, Georgetown, Lower Stillwater, Echo, Lake Five, Ninepipe, Pablo, Ennis, Lebo and Upper and Lower Red Rock Lakes. The status of the remaining 476 lakes remains unknown, but two current projects should shed more light on the eutrophication problem in Montana.

The Water Quality Bureau, U.S. Environmental Protection Agency and the Montana National Guard are sampling 16 lakes and reservoirs in the state as part of a national eutrophication survey. Covered in the survey will be Tongue River Reservoir, Canyon Ferry, Clark Canyon, Flathead, Georgetown, Hebgen, Koocanusa, Mary Ronan, McDonald, Nelson, Seeley, Swan, Tally, Tiber, Yellowtail and Lower Whitefish. The waters were chosen primarily for recreational importance, geographic distribution and range of severity and diversity of pollution sources. The lakes and tributary streams are sampled monthly at 90 sites for a year (Oct. 1974-Oct. 1975). This summer, three specially equipped helicopters are aiding researchers in intensive water quality sampling.

The Water Quality Bureau has also begun water quality inventories and management plans for all Montana river basins. Required by the Federal Water Pollution Control Act Amendments of 1972, the inventories will determine eutrophication status and sustainable waste loads for some of the most important lakes in the state, including Flathead.

FLATHEAD LAKE

Residents of Montana and the area immediately surrounding Flathead Lake know that the lake is mortal. Warm, dry weather and an excessive influx of nutrients into the lake in the early 1970s produced a number of localized, but unsightly, algal blooms. The concern and response of lake residents to these symptoms was serious and immediate. Flathead Tomorrow was formed, with the goal of insuring conservative land use practices in the valley and indefinitely preserving this priceless natural heritage for the benefit of future generations.

In 1974 the Montana Senate officially recognized that ". . . the waters of Flathead Lake, long celebrated for their clarity, are highly vulnerable to eutrophication and other pollution problems arising from the overloading of sewerage and subsurface disposal systems; and such problems have begun to appear in the lake" (Senate Resolution 52). Recent studies directed by Dr. John Tibbs of the University of Montana Biological Station at Yellow Bay confirm the seriousness and reveal the wide scope of the problem.

A February 1974 report by the station's staff concluded that Flathead Lake and its contributing waters face serious degradation from rural and domestic waste water, municipal sewage, livestock wastes, farming practices, subdivisions, recreation activity, forestry practices, industrial pollution and reservoirs—all associated with the rapid population and economic growth in the area. Researchers found that the lake receives larger amounts of nutrients than in the recent past and that estimates of increased nutrient inputs from cultural and agricultural practices are reason for alarm and vigilance. The report advised strong land use controls to avert serious water quality degradation in the lake and its contributing steams.

A recent study on the sediments of Flathead Lake by David Potter, UM graduate student, showed that the lake is filling at an average rate of three inches per year and almost five inches per year in the northern (inlet) part of the lake. It is only speculation how much of this sedimentation is natural and how much is man-caused. However, Potter surmised that human activity directly on the lakeshore is less important to lake dynamics and sedimentation than activity in other portions of the drainage.

Shoreline impacts are significant, however. Dredge and fill operations encroach upon the lake as some landowners try to create more shoreline for development. Early in 1973 plans to develop a 50-acre marshy

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area along Polson Bay into a man-made island with campground facilities drew public attention statewide.

These threats are serious; nevertheless, the basic water quality of Flathead Lake remains almost what it was nearly 50 years ago when the first reliable and comprehensive aquatic studies were performed. Ironically, Flathead is an example of what limnologists call an oligotrophic lake, meaning "sparingly fed." The lake is very deep (about 360 feet) and its waters are nearly always clear and well supplied with oxygen. Although the lake does not appear to be in imminent danger, every unhealed scar in the watershed and every intrusion of nutrient or sediment diminishes its value and life span in proportion to the insult.

OTHER TROUBLE SPOTS

The Montana Department of Fish and Game sampled 33 lakes in northwestern Montana during summer 1970 to classify them by nutrient condition. Criteria used to categorize the lakes included: dissolved oxygen, depth, vegetative abundance, area of shallow water, water exchange, temperature, transparency and chemical content.

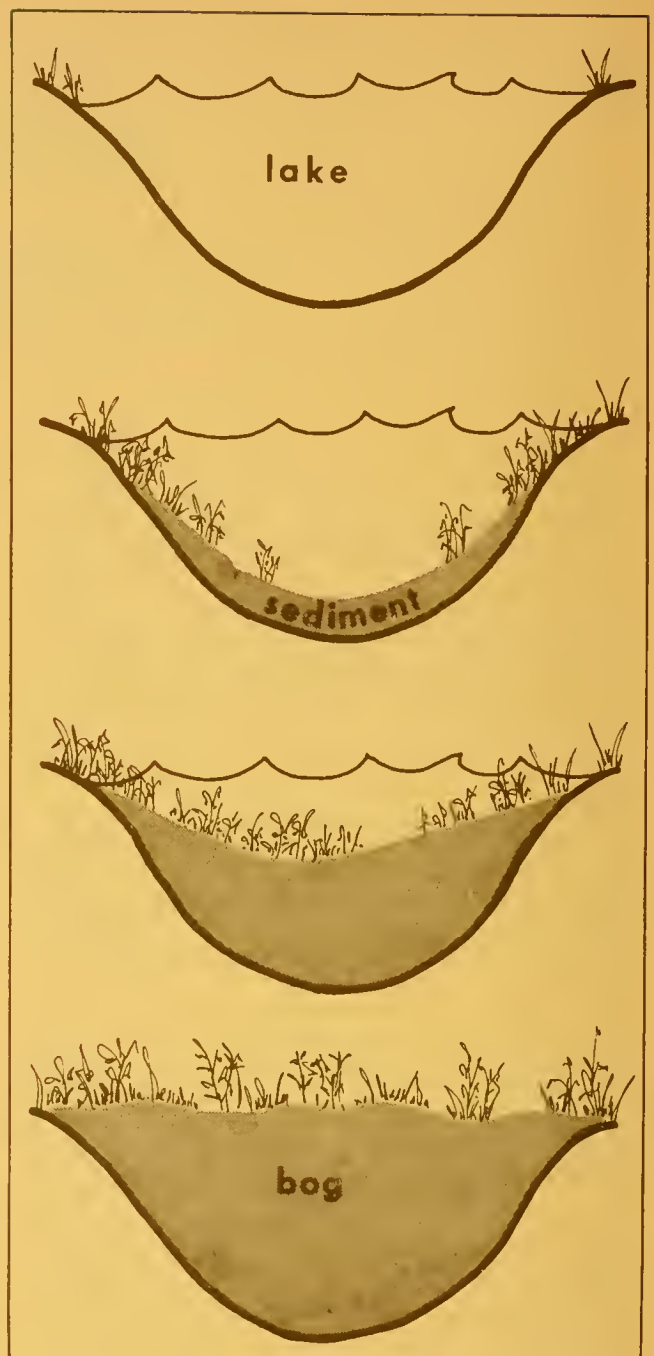
According to a report prepared by Robert Domrose, Region One fish management biologist, 7 of the 33 lakes were highly fertile and eutrophic: Island, Martin, Rainbow, Rogers, Topless, Lake of the Woods and Lake Mary Ronan. With the exception of Lake Mary Ronan and Island Lake, these lakes are relatively shallow (12-25 feet) and attain summer water temperatures approaching the optimum for salmon and trout. Serious oxygen voids occur frequently under the ice during winter and result in fish kills.

The 1970 survey also classified six lakes as oligotrophic: Dickey, Holland, Lindbergh, Blaine, Swan and Little Bitterroot. The remaining 20 lakes in the survey were placed in an intermediate category, mesotrophic. (Lakes of this class are already adequately nourished, responsive to incoming nutrients and subject to accelerated eutrophication from lakeshore development projects and overgrazing of the watershed.)

Adjacent land uses affect the futures of many Montana lakes. Among them are the following lakes in the Flathead area:

Lake Mary Ronan, just west of Flathead Lake, is a particularly productive lake well on its way toward eutrophy. Much of the lakeshore is dotted with cabins or homesites. From 1969-1971, a section on the west side of the lake was heavily logged and soil and dissolved nutrients were subsequently washed into the lake. During this same period, cattle often overgrazed creek bottoms and shorelines. (See the article on page 11.)

Whitefish Lake, near the town of Whitefish, has been described as a miniature Flathead Lake. Rapid subdivision activity is dividing the prime recreational land around the lake into smaller and smaller parcels



Eutrophication—the gradual succession of a lake into a bog.

for summer homes. Major recreational developments, even with good sewage treatment, contribute nutrients from surface runoff containing lawn fertilizers and the like. A major fill was created recently in the upper end of the lake where a developer gouged out a hillside to make more land for subdivision purposes.

Some 30 *glacial kettle lakes* northeast of Bigfork are important local recreational resources. Limnologists consider kettle lakes classical nutrient traps because of their closed or "pothole" basins. Most drainage is into the lakes and little water flows out. The entire area is slated for subdivision development

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and one of the lakes, Echo, already is ringed by subdivisions and shows signs of serious eutrophication.

According to a recent University of Montana study, nutrient enrichment of *Seeley Lake* results partly from human causes: old clearcuts in the drainage basin, many people using the lake for recreation and homesites, domestic animals grazing and fertilizers applied to pasture above the lake and septic tank leakage and overflow drainage into the lake.

RESERVOIRS

Montana has many large dams and reservoirs. Most Montana reservoirs have one common feature—an initial surge of excessive plant production immediately after filling. Because a dam is an artifact of culture, this type of eutrophication is usually included in the cultural or accelerated category.

River floodplains are enormously productive, accumulating nutrient-rich sediments for thousands of years. So, agriculture and wildlife both flourish along creek or river bottoms. What happens when these rich bottomlands are flooded is not surprising. Nutrients once used to produce alfalfa or white-tailed deer forage are now available to blue-green algae and the water blooms. Nutrients discharged into the impounded river from municipal waste treatment plants or agricultural or industrial activities may compound the eutrophication problem.

Lakes and reservoirs are usually quite distinguishable. Most reservoirs have an ugly "bathtub ring," a barren no man's land between high and low water levels where vegetation cannot take hold. On the other hand, most lakes have stable shorelines. A lake is usually deepest toward the middle; a reservoir is almost always deepest at the dam end. A lake drains from the surface, while a reservoir is usually discharged at depth. A lake's life is measured in centuries, but a reservoir may not live to see 100 years before silt fills it. Crediting a dam with creating a lake is like crediting a smokestack with creating a cloud.

Many Montana reservoirs show premature symptoms of eutrophication. Several have been studied extensively by Dr. John Wright and his students at Montana State University and the following summarizes their findings and describes factors leading to eutrophication.

Georgetown Reservoir, on Flint Creek about 18 miles west of Anaconda, dates from 1894. It ranks as one of the most heavily fished waters in Montana. Because it is very shallow, most of the reservoir supports a luxuriant growth of rooted aquatic plants. When these die and decay under winter ice cover, severe oxygen depletion and fish kills result.

A 1971 Department of Fish and Game memorandum indicated that accelerating eutrophication was caused by improperly designed septic tank facilities of houses and cabins on the reservoir, fill pushed into the reservoir to extend cabin sites, bank erosion aggravated by waves from boats and use of the watershed for logging and grazing. However, studies conducted by Wright and his students in 1973 found no evidence of cultural eutrophication; they concluded that the reservoir is inherently eutrophic because it is so shallow.

Summer algal blooms are common on *Canyon Ferry Reservoir*. Wright studied the reservoir's limnology from 1957-1958 shortly after impoundment. Then in 1971, he and his students followed up the original study. They found that the reservoir was no more eutrophic in the 1970s than in the 1950s because more nutrients were leaving the reservoir than entering. This was especially true of certain nitrogen compounds important to algal growth.

The recent study determined that most nutrients came into the reservoir from the Gallatin River, probably from the Bozeman sewage discharge, via the Missouri River at Townsend. Agricultural activities between Toston and Townsend add other nutrients. The studies also found that the amount of nitrogen available in the reservoir each year is directly related to the amount of annual drawdown and exposure of sediments. It is possible that the Bureau of Reclamation's Canyon Ferry Dust Abatement Project (to cover exposed and blowing sediments with water in a series of ponds) will reduce the reservoir's nitrogen content significantly, thus alleviating its eutrophic condition. (For details of the Canyon Ferry project see "From Dust to Ducks" in the May/June 1975 *Montana Outdoors*.)

Yellowtail Reservoir is a long, deep impoundment on the Bighorn River south of Billings. In spite of its great depth (450 feet), shortly after storage began in 1965, the reservoir showed telltale blue-green algae blooms. The dam is operated with a deep water withdrawal system which ordinarily depletes a reservoir of nutrients because the discharge removes nutrients that would otherwise accumulate in deep water. But in Yellowtail some of the nutrients that entered the system were unexplainably retained, to the point where nothing limited the algal growth. The reservoir is fertilized with nutrients from the major tributaries, the Bighorn and Shoshone rivers, which in turn are enriched by agricultural activities in Wyoming.

Hebgen is an old reservoir (completed in 1915) on the Madison River near West Yellowstone. A highly productive reservoir, it is fed by naturally fertile waters flowing from the thermal springs of Yellowstone National Park. Blue-greens comprise most of the plankton algae. A very popular reservoir on a "blue-ribbon" stream Hebgen has been subjected to the side effects of approximately a dozen shoreline subdivision developments in recent years.

According to Thomas Bonde of the Corps of Engineers in Libby, Montana's newest reservoir—*Koocanusa*—sported a bloom of blue-green algae in mid-October 1974, just months after the reservoir was completely filled. Bonde attributes this early surge in productivity to the fertility of the Kootenai River and effluent from a fertilizer plant near a Canadian tributary.

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Considering the past performance of existing reservoirs in Montana, the inherent fertility of the Paradise Valley and the cool, productive waters of the upper Yellowstone River, *Allenspur Reservoir*, if it were built, could rank as one of Montana's largest outdoor algal cultures.

RIVERS

Unlike lakes, rivers indefinitely renew themselves, purge foreign substances from their systems and recover lost health. Eutrophication is a problem only in slowly meandering streams receiving heavy organic loads, such as Ashley Creek near Kalispell or Blacktail Creek near Butte. Fears of irreversible eutrophication in the Flathead River or the Gallatin River are unfounded. Only where these rivers discharge into lakes or reservoirs, such as Flathead or Canyon Ferry, can eutrophication manifest itself. However, streambank alteration and suffocating siltation can be very serious problems in nearly all streams.

Recent concern has surfaced about potential nutrient contamination of the West Gallatin River from subdivision activity in the Gallatin Canyon. A report by the MSU Gallatin Canyon Study Team predicts that algae could become a nuisance to fishermen if the phosphorus concentration of the stream should reach 0.10 milligram per liter. However, the report continues, with a minimum flow of 226 cubic feet per second (and some sewage treatment), the stream could accept the phosphorus from the waste of 66,000 people before reaching the nuisance concentration.

It's difficult to imagine 66,000 people—or a city the size of Billings in the Gallatin Canyon—before gross biological symptoms of nutrient enrichment become evident in the river. Clearly, the semi-primitive nature of the Gallatin Canyon will be substantially altered and other environmental support systems severely strained long before the first carp rolls in a backwater below Big Sky. Assuming waste water is treated, surface water quality will clearly not be the factor limiting population growth in the Gallatin Canyon. Water quality laws cannot control private subdivision growth that is publicly undesirable for other reasons, e.g., destruction of winter wildlife range.

PREVENTION AND RESTORATION

Cultural eutrophication can be prevented by controlling sediment and nutrient input into lakes and reservoirs. The Montana Shoreline Protection Act was introduced by Rep. Francis Bardanouve (D-Harlem) in 1973, debated in 1974 and reintroduced and killed in 1975 on second reading in the Senate. An alternate bill, S.B. 175, was introduced by Bob Brown (R-Whitefish) and has been signed by Gov. Thomas L. Judge. While the bill does not require comprehensive zoning for all land uses, it does institute a permit program controlled by the local governing body for any work done in the bed of a lake itself or on its immediate shoreline.

Water quality laws and regulations already in effect help control eutrophication. These include the Federal Water Pollution Control Act Amendments of 1972, the Montana water pollution control law, various subdivision laws and regulations, state water quality standards and nondegradation policy and the Stream Preservation Act.

For lakes receiving municipal sewage effluents—like Flathead Lake receives from Kalispell, Whitefish and Bigfork—and for lakes known or suspected to receive leakage from septic tanks and drain fields—such as Georgetown and Hebgen—central collection and land disposal of sewage may solve eutrophication problems. Land disposal involves pre-treating sewage, applying it to the soil to help grow a profitable crop and thus utilizing nutrients otherwise misplaced in aquatic systems.

Once a lake becomes eutrophic, there is no easy way to restore it to its original healthy condition. Although significant recoveries are reported in a few cases where the major nutrient source was diverted to another body of water, the nutrient problem was merely transferred. One water's cure became another's sickness.

Several treatments have been proposed and experimentally tested for rehabilitating eutrophic lakes, including dredging, aeration, plant harvesting, flushing and chemical treatment. In full-scale field application, these methods are usually very expensive and not always successful.

SUMMARY

Cultural or accelerated eutrophication begins at home, in the woods, in the field or on the range—anywhere land is abused or human activity concentrated. It is a problem of lakes and it is compounded by people.

Perhaps more than anything, eutrophication is a symptom of the wastefulness of our time—fertilizers are in short supply, yet valuable nutrients are squandered to grow algae in lakes and streams.

Premature death is a tragedy, for a person who remains unfulfilled or for an animal that has not reached its prime. It is no less tragic for a lake whose useful life span has been foreshortened and future options foreclosed by cultural eutrophication.

RECOMMENDED READING:

"Over Fed," by Janice Crossland and Julian McCaull. *Environment*, Nov. 1972, Vol. 14, No. 9, pages 30-37.

"Tahoe's Troubled Waters," by the Tahoe Research Group. *Natural History*, Jan. 1975, Vol. 84, No. 1, pages 60-67.

"The Algal Bowl—Lakes and Man," by John R. Vallentyne. Canada Department of the Environment, Fisheries and Marine Service, Miscellaneous Special Publication 22, Ottawa, 1974. 186 pp.

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1975 LEGISLATIVE ROUNDUP

The following is a brief summary of legislation considered during the 1975 Montana Legislature pertinent to fish, wildlife and the environment. All bills listed have been signed by Gov. Thomas L. Judge and will go into effect July 1, 1975 unless otherwise indicated.

Space limits us to short, and often probably incomplete descriptions. For additional information, contact the Legislative Council, Room 138, State Capitol; Helena, MT. 59601.—Ed.

SENATE BILLS

S.B. 19 (Lynch, D-Butte)

Removes the imposition of confidentiality from information submitted to the Department of State Lands under the act providing for development, mining and reclamation of lands disturbed by hard rock mining. This will allow us to represent fish and wildlife through environmental impact procedures.

S.B. 87 (Towe, D-Billings; Watt, D-Missoula; Regan, D-Billings, and others)

Creates a fund for research into alternative energy sources. Provides for funding from coal taxes and establishes a coal board under the Lt. Governor's office for consideration of grants.

S.B. 92 (Colberg, D-Missoula)

Defines *prima facie* evidence of injury to an owner's water supply in a designated ground water area and shifts burden to strip mine operator in a nondesignated area.

S.B. 105 (Flynn, D-Missoula; Turnage, R-Polson)

This bill prohibits the resale or commercial use of confiscated fish and game by purchasers at auction sales. The bill provides that only one carcass of either deer, moose or elk can be purchased by an individual during an auction, and the bill allows the department to donate unsold carcasses to welfare departments, public institutions or charitable institutions.

S.B. 168 (Lee, D-Butte; Healy, D-Butte; Mehrens, D-Anaconda, and others)

This bill allows disabled persons to fish without a license if they are residents of Montana not residing in an institution and are certified as disabled by a licensed medical doctor.

S.B. 175 (Brown, R-Whitefish; Roberts, D-Libby; Drake, R-Helena, and others)

Protects lakeshores by requiring permits for work which would alter the lake. The bill also requires local governments to adopt regulations governing issuance of the permits.

S.B. 236 (Norman, D-Missoula; Flynn, D-Missoula)

This bill increases resident and nonresident hunting license fees; provides a limit on the number of nonresident combination game licenses and gives the Fish and Game Commission authority to limit the number of big game licenses sold in designated hunting districts. The bill will be effective May 1, 1976.

S.B. 245 (Turnage, R-Polson; Brown, R-Whitefish)

Provides that a vessel, including houseboats and floating cabins, equipped with a galley or toilet shall have, not later than April 30, 1976, a waste water holding system, sealed to prevent the discharge of sewage, whether treated or untreated, into the surrounding waters.

S.B. 255 (Dunkle, R-Helena)

Provides that every motor boat (including sailboats, rubber rafts, canoes, etc.) propelled by motor or engine of any description shall be properly numbered.

S.B. 279 (Roberts, D-Libby)

Provides for a $1 fee for a resident wildlife conservation license and provides free fishing privileges for veterans residing at veterans administration hospitals, within or outside the state. The bill also deletes the pioneer and combination pioneer-wildlife conservation licenses and provides for fishing and bird hunting by persons 62 years old or older with the $1 wildlife conservation license.

S.B. 310 (Greely, D-Great Falls; Towe, D-Billings; Hazelbaker, R-Dillon)

Extends the concept of the Stream Preservation Act to private projects with supervision by the board of supervisors of a conservation district with the Department of Fish and Game serving in an advisory role.

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S.B. 395 (Roberts, D-Libby)

Amends the Montana Water Use Act, clarifying a number of provisions. Amendments to improve fish and wildlife's claim on water were defeated.

HOUSE BILLS

H.B. 83 (Day, D-Glendive; Robbins, D-Roundup, and others)

Prohibits change of use for water rights from agricultural to industrial.

H.B. 93 (Vincent, D-Bozeman; Luebeck, D-Butte)

Provides for the assessment of a penalty for violation of provisions of the Stream Preservation Act by agencies of state government. Violators will be assessed a fine of not less than $100 nor more than $500 for each day of continuing violation, but not more than a total of $1,000. Also, at the discretion of the court, the agency shall restore the damaged stream to its prior condition. This bill gives the Fish and Game Commission authority to institute and maintain the enforcement proceedings.

H.B. 104 (Johnston, D-Cut Bank; Barrett, R-Lewistown, and others)

Provides that persons making valid application and who did not receive a special elk permit during the preceding season shall receive first preference in the drawing for first, second and third choice hunting districts.

H.B. 195 (Kvaalen, R-Lambert; William Baeth, D-Libby, and others)

This bill makes it unlawful to use an artificial light attached to or cast from a vehicle having a luminance of greater than .75 candlepower to spot wildlife or domestic livestock while having in possession a firearm or other implement capable of killing wildlife or domestic animals. Landowners are exempted while on their own lands.

H.B. 226 (Ellison, R-McLeod; Staigmiller, D-Cascade)

Extends the privileges granted under a landowner's trapping license to include trapping for any furbearing animal, including beaver.

H.B. 258 (Huennekens, D-Billings)

Provides that off-road vehicle restrictions (Sec. 26-301) apply only to hunting on state or private land, and not to hunting on federal land unless the federal agency specifically requests or approves state enforcement.

H.B. 288 (Jim Moore, D-Kalispell, Bradley, D-Bozeman)

Deletes the black-footed ferret from the list of furbearing animals and the wolf from the list of predatory animals.

H.B. 290 (Huennekens, D-Billings; Driscoll, D-Hamilton, and others)

Allows the owner of a newly purchased snowmobile a 10-day grace period from the date of purchase in which to make application for a current tax-paid decal, provided that a bill of sale or other proof of purchase is carried by the operator at all times. This bill also changes the assessment date on snowmobiles to July 1.

H.B. 292 (Huennekens, D-Billings; Staigmiller, D-Cascade, and others)

Classifies all species of the sturgeon family, all species of the burbot or ling family and channel catfish as game fish.

H.B. 306 (Bardanouve, D-Harlem)

Provides that county commissioners may initiate a request for closure of lands to trespass, including hunting and fishing, due to fire danger. However, the Department of Natural Resources and Conservation may adapt reasonable rules specifying the fire prevention and suppression measures that must be taken by the county commissioners before a request may be submitted and considered.

H.B. 340 (Shelden, D-Libby; Bradley, D-Bozeman, and others)

Authorizes agencies to adopt rules imposing fees to be paid by the applicant for a lease, permit, etc., when the agency is required to compile an environmental impact statement.

H.B. 341 (Shelden, D-Libby; Bradley, D-Bozeman, and others)

Amends the Open Space Land Act to include voluntary conservation easements.

H.B. 352 (Dussault, D-Missoula; Lester, D-Great Falls, and others)

Makes it unlawful to place junked motor vehicles, or the body portion of junked motor vehicles, between high water channel banks of any stream or to reinforce banks of a stream. Violations carry a fine of not more than $250, imprisonment of not more than 30 days or both.

H.B. 365 (Russell Baeth, D-Martin City)

Defines nongame wildlife as any wild mammal, bird, amphibian, reptile, fish, mollusk, crustacean or other wild animal not otherwise legally classified by statute or regulation of the state. Also makes it unlawful to transplant or introduce furbearing animals or nongame wildlife without authorization by the Fish and Game Commission.

H.B. 493 (Jim Moore, D-Kalispell; Vincent, D-Bozeman, and others)

Provides for penalties for violation of provisions of the Nongame and Endangered Species Act.

H.B. 453 (Stoltz, D-Valier; Johnson, D-Missoula, and others)

Provides for suspension of action on certain applications for certificates of environmental compatability and public need for two years during which a comprehensive Montana energy policy will be formulated. This proposal is actually a temporary moratorium on siting of additional energy-related utilities and associated facilities. It represents an export policy on coal until state plans are developed.

H.B. 500 (Sloan, D-Kalispell; Gilligan, D-Great Falls)

Removes a state restriction on the hunting of migratory waterfowl from a boat. By removing this restriction, the state can now adopt the federal restriction on such activities.

H.B. 581 (Bardanouve, D-Harlem; Meloy, D-Helena, and others)

Revises the Montana Utility Siting Act of 1973 to include all major facilities which convert energy on a large scale. It exempts transmission lines of less than 230 kilovolts which are less than 10 miles long.

H.B. 642 (Driscoll, D-Hamilton; Bengston, D-Shepherd)

Creates the Renewable Resources Development Program and assures that it is in the public interest and that the existing high quality of land, air, fish, wildlife and other recreational qualities will be maintained. It provides that a portion of the coal tax financially support the program and institutes a procedure for borrowing on the basis of anticipated revenue.

H.B. 661 (Hager, R-Billings; Fagg, R-Billings, and others)

Authorizes the Fish and Game Commission to use the installment contract method for acquisition of wildlife management areas or public fishing access sites. The total cost of such installment contracts may not exceed the cost of purchases authorized by the commission and appropriated by the legislature.

H.B. 666 (Vincent, D-Bozeman; Meloy, D-Helena, and others)

Amends the subdivision law to require the local governing body to disapprove any subdivision that it finds is not in the public interest.

H.B. 672 (Fagg, R-Billings; Fabrega, R-Great Falls, and others)

Establishes procedures for Montana's economic development and standards of land usage through local government control.

H.J.R. 41 (Jim Moore, D-Kalispell; Bradley, D-Bozeman, and others)

Directs the Fish and Game Commission to initiate proceedings within 90 days to promulgate a rule listing the American peregrine falcon, the whooping crane, the northern rocky mountain wolf and the black-footed ferret as endangered species of wildlife indigenous to the state.

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dear F&G

SAVE ROCK CREEK

I subscribe to your magazine and would like to point out a situation that hopefully may be of interest to you. I think that Rock Creek, east of Missoula, is being destroyed by people in the area who apparently have little environmental consciousness.

There are at least four subdivisions under development in the Rock Creek basin. Although construction in these subdivisions is really just beginning, I think the trend is evident. There are some mobile homes and other houses with almost no sewage facilities standing within a few feet of the stream. The state health inspector made his first trip up Rock Creek in over two years this summer. He made only a couple of cursory inspections of the dozens that should have been done. Junk cars and other refuse is scattered around some of the dwellings.

A number of people in the area are very concerned about recent developments and trends. They have formed the Rock Creek Association. I am sure the secretary, Gordon Long (Box 1465, Route 1; Clinton, MT 59825), could provide information. Another person active in saving Rock Creek is Adam Michnevich (Route 1, Clinton).

I have written to the district fish and game office in Missoula about my concern and also to Sens. Mansfield and Metcalf and former Rep. Shoup. I think that an article in *Montana Outdoors* about what is happening to Rock Creek could probably do more to save it than anything else.—*Loren R. Barker; Kamuela, Hawaii*

DON'T RENDER MERE WORDS

Congratulations on your Jan./Feb. 1975 issue. I think it contained some of the most needed and useful articles on growth and its possible ill effects on Montana's environment that I have ever read. The danger is real and I think Montanans are fortunate in still having the opportunity to check its evils before irreversible or expensive-to-reverse environmental destruction results. My great hope is that action will be taken rather than words merely rendered.

As a native Montanan having had the sad opportunity to witness the results of unchecked growth during six years residence in Japan and two in Brazil, I have reason to fear its appearance in Montana. The air in Tokyo went from bad to indescribable—some days people are actually warned to stay indoors rather than risk the ill effects of breathing outdoors. Fireflies, once abundant in Tokyo, have disappeared or moved out, as have several species of birds. The famed cherry blossoms have changed from pink to white due to lack of sun, while Tokyo Bay no longer supports life of any kind in some areas. Some rivers flowing through Tokyo bubble gases and float various kinds of debris—from oil to sewage.

The northeast of Brazil, where I now reside, has the same opportunity Montana has to grow without environmental destruction if *proper* planning and *rational* growth is undertaken. So it is with sadness that I watch the beautiful beaches here slowly polluted by tar, oil, sewage and garbage, and the unchecked growth of second home beach houses side by side, marring what would otherwise be beautiful scenery in serene surroundings. So far air and water pollution don't appear to be serious but the *potential* for serious damage exists if left unchecked.

While watching the environmental destruction in these two countries I often found myself asking: Is this what we set out to achieve when we began to worship growth and progress as the gods necessary for the achievement of universal happiness—the destruction of what we had that was good for the achievement of what we were lacking?

I might add that someone apparently thought the environmental problems in Tokyo offered a good market for disposing of some fine Montana land up the Gallatin Valley as I saw a large advertisement in a Japanese newspaper offering some for sale.—*Gary G. Fish; Ceara, Brazil*

$500 FEE UNREASONABLE

For years I have enjoyed hunting in your state. I think the fees are reasonable.

However, if your legislature should ever enact a $500 fee or anything like it to hunt on public land—our land—I would be the first to visit the government agency or department with jurisdiction over that land and suggest they take complete control, including game and license fees. In this case, I believe it would be the right thing to do.—*Fred Fierke; Nekoosa, Wis.*

KEEP ON SPEAKING OUT

I recently subscribed to your magazine and have thoroughly enjoyed and admired the work you've done. It not only is admirable because you are making people aware of conditions that will be affecting their life styles both immediately and in the distant future, but you also have the courage to speak out when so few are willing to risk that these days.

Keep up the good publication.—*William R. Stephens, Chipewyan Lake School, via Calling Lake, Alberta, Canada*

PRAISES MILLER'S ARTICLE

Your March/April 1975 magazine was a fantastic issue.

Arnold Miller's article, "The Energy Crisis as a Coal Miner Sees It," was one of the most refreshing, honest, sincere and enlightening articles it has been my pleasure to read. Thank you for bringing Miller's thoughts to me. I appreciate what you're doing.—*Charlie A. Poole; Missoula, Mont.*

FROM DREAM HOME TO NIGHTMARE?

I have taken great pleasure and interest in reading the many articles in *Montana Outdoors* about subdivision in Montana. My husband and I are both lovers of the wilderness and are looking forward to making our home in your great state.

Unfortunately, we are among those who have bought a 10-acre tract in Montana. We are hoping to get help and advice from the different agencies in Montana so that our home will not be in conflict with the surrounding environment. Our land is in the Three Forks area, and we would be very interested in any information you might be able to give us on the trend of development there. The name of the land development is Ponderosa Pines and we were told it is to be kept pretty much in its natural state.

We would not like to think of our "dream home" as an animals' graveyard. I have seen the beautiful pine forests of north Virginia go under to the blade of a bulldozer so someone could make a million. I would not like to see that happen to beautiful Montana.

I am in the military, presently stationed in Hawaii, where they have what is called the "Quiet Revolution." I'm not certain

continued

SPRINGBOARD

"Man always kills the thing he loves, and so we the pioneers have killed our wilderness. Some say we had to. Be that as it may, I am glad I shall never be young without wild country to be young in. Of what avail are forty freedoms without a blank spot on the map?"—*Aldo Leopold, "A Sand County Almanac"*

FOR DISCUSSION

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how their land law works, but the entire island of Oahu is about to become a land of continuous high rises. Also, one does not own the land on which his house rests—one leases it. If it weren't for the sugar cane and pineapple fields, the island would be covered in concrete.

That is why we have chosen to make our home in Montana when we leave Hawaii. It is refreshing to see a state department take an interest in the people. We hope we will be accepted into the community and be able to contribute to the future and betterment of Montana. I was told by my father years ago, "If you take care of the land, it will take care of you." Please keep up your fight against the irresponsible land developer, but please don't deny to those few of us the pleasures of living with and see all of nature's beauty.—*Elizabeth Goodrow, APO San Francisco*

OFF BACKSIDES AND ONTO FEET

This check for a subscription is long overdue. I have been buying your magazine at the local F&G office for some years, but I felt that perhaps an actual check would show my support of your editorial policy much more than newsstand purchases.

As soon as I compile the list, I will purchase gift subscriptions for my out-of-state friends—not to push Montana off on them, but as an illustration of how a positive thinking, environmentally oriented publication can be successfully and tastefully presented to the public in an era of politically motivated journalism.

I realize your publication gets a large amount of abuse and criticism from many elements, which feel offended by your frankness. It would seem that too few people or organizations that are government funded have the backbone to get off their backsides and stand on their feet and represent the vast majority of the people. I thought that was supposed to be the primary purpose of government, instead of the vocal, well-funded, vested interests that have seized control of the rest of the state.

Thank you for a fine magazine and an intelligent editorial policy.—*Robert Meinecke; Bozeman, Mont.*

contributors

Seeley Lake, Whitefish Lake, Lake Mary Ronan—maybe you've fished, swum, boated or just lounged on the shore of one of these lakes. But these are among the lakes in Montana threatened with eutrophication, which means "too well fed"—too many nutrients, too much sediment, etc. **Loren Bahls** looks at the process, tells you how it happens, why it happens and where it's happening. A staff ecologist for the Environmental Quality Council, Bahls has lectured on eutrophication at Montana Tech and taught a course on fresh-water algae at Montana State University, Bozeman. He holds a B.S. in fish and wildlife management from the University of Minnesota and a Ph.D. in botany (aquatic ecology) from MSU. No newcomer to the eutrophication problem, he worked on MSU's Gallatin Canyon Study Team, eutrophication subproject. His article, "On the Care and Feeding of Lakes," begins on page 14.

Harmon Henkin fans will be pleased to note that his reminiscences once again lead off a *Montana Outdoors* recreation guide. He recalls with a degree of fondness and chagrin his first year of fly fishing in Montana—"Notes from my Rookie Year"—and confesses that his first foray to Rock Creek began and ended at an irrigation ditch, confusingly close to the famed blue ribbon trout stream. His first book, "The Environment, the Establishment and the Law" was published in 1970 and a second, "Fly Tackle: The Tools of the Trade" will be published this fall by Lippincott Co. His articles have appeared in *Outdoor Life, Sports Illustrated, Nation* and the New York Times. The recreation guide also includes a helpful primer on fly lines, rods, reels and a list of flies to get you started in the sport. **Marty Beatty**, MO's circulation manager and a fly tier in his spare time, tells you how to tie a wooly worm. Turn to page 23 and get ready to learn all about a great Montana outdoor activity.

The "what ifs" are sometimes not very pleasant to think about. But "what if" you were bitten by a rattlesnake and "what if" you had no idea what to do? Turn to page 46 where **Dr. Donald E. Espelin** and **Vern Craig** tell you what steps to follow. Dr. Espelin is a pediatrician and director of the Poison Control Center in Helena. He received his medical training at the University of Utah and was associated for a number of years with Dr. Alan K. Done, professor of pediatrics at the University of Utah and head of the Poison Control Center in Salt Lake City. Editorial assistance was provided by Craig, the department's special assistant who is well known to our readers for his many humorous and thought-provoking cartoons and articles.

Both elk and logging are big pieces of Montana's economic pie. Demands for these two products are increasing. And unfortunately, some of the areas that are most prized by elk are also sought as prime logging country. **Terry Lonner**, a research biologist for the department, has been working on a cooperative elk-logging study since spring 1972. He gives detailed information about each of the study's components and the status of the research. He applies the apparent conflict between elk and timber management to the current worldwide problem of economics vs. natural resources utilization. Lonner holds B.S. and M.S. degrees in fish and wildlife management from MSU. See his article, "Elk and Logging—an Update," on page 38.

If it's Sept. 27 and you're short on ideas for something to do, **Bill Pryor** has a worthwhile suggestion—celebrate National Hunting and Fishing Day, 1975 edition. In his article, "You Can't Keep a Good Idea Down," he tells you how the day got started and some of the ways it's celebrated across the country. Because sportsmen cared, wildlife in general have benefited. When those men in hip boots and canvas coats were busy doing their thing for wildlife, where were the predecessors of the anti-sportsmen groups, he asks. Pryor is the department's information officer in Billings. He holds a B.A. in philosophy from the University of Illinois and a M.S. in zoology from Western Illinois University. He previously worked for the Illinois Department of Conservation and the National Rifle Association. Turn to page 7 for his article.

It's not a case of "either/or" but a case of "both/and"—*both* the Alaskan pipeline *and* a Canadian pipeline. The pipeline will begin in Prudhoe Bay in Canada and run to Delmont, Penn., a distance of some 4,000 miles. It will cross 11 states—among them Montana—and the environmental toll could be astounding. "The Gas Company's Pipe Dream" by **Mike Aderhold** begins on page 43. Aderhold is the department's information officer in Glasgow. He holds a B.S. in zoology from the University of Michigan and a M.S. in wildlife management from the University of Montana, Missoula. He worked with the Corps of Engineers in Florida and with the U.S. Forest Service and the U.S. Fish and Wildlife Service before joining the department.

The front cover watercolor was done by **A.J. McCoy** of Heart Butte. A wildlife artist who works mostly in watercolor and oil, Mrs. McCoy recently showed her work in San Antonio, Tex., at the Fifth Annual International Big Game and Fisherman's Conference. Her work was also featured on the cover of *Sports Afield*. Her work is shown, by appointment only, by Bill McRae; Fairfield, MT 59436; telephone 406-476-2581.

We're grateful for **D. Roscoe Nickerson's** humorous contribution to our Catchall section, "Tail Tale." Long a spinner of tall tale yarns, Nickerson has been secretary of the Skyline Sportsmen's Association, Butte, for 15 years and was president of the United Sportsmen's Association of Montana in 1964-65. Since his retirement as an accountant, he has written a weekly outdoors column for the Montana Standard, Butte's daily newspaper. Turn to page 32.

photo by Jerry Monley

FLY FISHING

NOTES FROM MY ROOKIE YEAR by Harmon Henkin

FLY FISHING PRIMER by Harmon Henkin

TYING FLIES by Marty Beatty

NOTES FROM MY ROOKIE YEAR

by Harmon Henkin

Oct. 23—Rock Creek

"Rock Creek?" Why it's just up that dirt road. Can't miss it." I quickly thanked the woman behind the counter of the cafe, rushed back to my car and headed up the dusty road.

This was it. For five years I had planned to move out West and fish the fantastic trout waters I had drooled over in the outdoor magazines. Now here I was on my first day out—which also happened to be the last day of the season.

I had begun the morning dutifully unpacking my household belongings. But the warm October afternoon sun disarmed me and I threw responsibility to the wind and went fishing. I decided that my first outing would be on famous Rock Creek, that wild, wonderful stream 20 miles east of my new home in Missoula.

The road curved for a few miles and then a small creek came into sight. I slowed down and peered.

"That's the famous Rock Creek?" It was about six feet wide, shallow, slow and had almost no cover. Maybe it was a spring creek? Well, this is where she told me it was. I got out and looked some more. I couldn't see any fish but maybe it was like those little eastern streams where you had to sneak up on the lunkers.

But deep inside I felt like a kid who just had his first intimation that there wasn't any Santa Claus. I wasn't giving up though. I strung up my fine bamboo rod, put on a 10-foot leader, and after debating for a couple of minutes, tied on a Royal Wulff. That was a good western sounding fly.

I crept up to the bank and made the most graceful cast of my life. The fly drifted aimlessly back to me. Well, that was just the first cast.

Two hours, two hundred casts and some few hundred yards later I was still on my knees and the sun was heading home. I hadn't seen a trout or even a place where any self-respecting trout would hang its hat.

Then I got the strange feeling that someone was watching. I looked back and saw a rancher in an old pickup truck giving me a strange look. I stood up and looked back.

"Son, what you doing fishing that irrigation ditch?"

Irrigation ditch? Is that what they've done to my Rock Creek? Turned it into an irrigation ditch. I charged over to the truck.

"You'd be a lot smarter driving up the road a half mile and fishing Rock Creek. I lived here 60 years and never seen a fish in that little ditch. We just use a little of the creek water for our vegetable garden."

If I could have disappeared into my waders I would have. The rancher shook his head slowly like he had discovered another variety of nut and drove off.

A half mile up the road was the most beautiful mountain stream imaginable, with big boulders and white water, looking all the world like a housing development for trout.

But it was cold and almost dark and my first day of fishing in the glorious West came to an end.

June 15—Rock Creek

I hesitated before entering the water. On opening day, a month before, I had learned that when westerners talk about high water they mean "High Water." Anglers driving up Rock Creek to begin the season in late May had been greeted with a torrent of brown water. The stream, normally about 50 feet wide and always tough to wade, had doubled its usual size and appeared as menacing as the river Styx. Any trout stupid enough to show its head would have probably been washed out to the Pacific Ocean in two minutes.

But now it looked mellow and normal. The bottom was visible and the wealth of trout-holding water looked accessible—but best accessible from the other side.

I had spent my first Montana winter talking with anyone who would stand still long enough to be questioned about fishing and reading anything with the words "Montana," "fishing" and "flies" in it. I was an "expert" and had the 10 dozen finely tied western flies for which I had scrimped and saved to prove it.

But I retreated after one step and decided that a stout staff would be added insurance for my first big wading outing. I broke off a dead limb and started out again. I would take a step, plunk down the staff and then repeat the maneuver. After 15 feet, I thought I had it made. That business about how rough western wading was seemed like nonsense. Just another 30 feet and I would start hauling in monster trout.

The I took the big step. I plunged the stick into a hole three feet deeper than the surrounding water. Naturally my body followed it down and the strong current knocked me over. When I righted myself, I was heading downstream like a rudderless kayak. A few hundred yards away I could see churning white water bouncing off a boulder the size of my house. Having no desire to imitate the steel ball in a pinball machine, I frantically stuck the bamboo rod in my teeth and anxiously paddled toward the shore like a big beaver building a dam with precious sticks.

A few minutes later I crawled on the bank and lay there. The roaring water was a few scant yards downstream and I thanked the great angler's god for my survival.

Then I felt the big pocket on my vest. It was empty. Ten dozen valuable flies were gone. They must have been floating downstream in that big plastic box, appearing to fish like a behind-the-glass-offering in an automat. They could see them at least, so they were one up on me. Maybe some lucky angler in the 20 miles of river below would go home with $60 worth of flies—pretty good, even if he got skunked.

Still stunned, I looked at my rod. Near the handle was the prettiest set of teeth marks I'd ever seen. I could have sold them to a dental college, but as a fishing rod that $150 stick was doomed. The marks made in my panic were a good 1/8-inch deep, but the marks on my soul were deeper.

I started shivering. The blue line on my water thermometer was at 51 and it looked like rain.

Waddling back to my car, I gave serious consideration to

becoming a professional chess player. They never have to behave like beavers nor are their boards and pieces washed away.

June 25—Bitterroot River

Dick Eggert and I should have known enough not to get into a boat together. In the Marine Corps I had been in most every type of vessel known to man and Dick had done a lot of canoeing in the Midwest. But together we were a mixture of nitro and glycerine.

While attending college in Michigan, Dick and I dropped a $100 portable radio overboard while bait fishing on a peaceful lake one Sunday afternoon. Early one morning on another lake we got caught in a mini-tornado that almost cost the world two of its more inept anglers.

But the Bitterroot was running high this year, and we had heard the sporting goods store gossip all winter that it had some lunker trout. We drove along it a number of times during the first weeks of fishing season and on one outing even took a couple of nice fish on spinning tackle and bait.

So when Dick suggested we try out his new deluxe four-man raft, I threw good sense to the wind and agreed. We drove upstream about 50 miles from Missoula, inflated the yellow craft and it was anchors aweigh.

I became nervous looking at the river. Though natives said it was merely high, I decided that the Bitterroot must have looked that way during Noah's angling days. The water was murky, with branches and small trees floating by. If a house had drifted past, it wouldn't have shocked me.

But the river didn't look like it had rough rapids even though it was overflowing its banks when we took off. As we floated down, I made several fruitless casts with my spinning outfit and Dick amused himself by giving me advice and bragging about how easy it was to run a river in a raft.

We kept pretty close to the middle of the water, moving along at a good clip and trying to work out a good handling technique. After two miles we were confident—no, actually overconfident.

Then we went around a large bend and the river doubled in size and slowed down. Dick got bored, claiming the sport was too dull for the likes of him. But a weird feeling started gnawing at me.

"Dick, do you hear a funny noise?"

"No."

He was facing downstream.

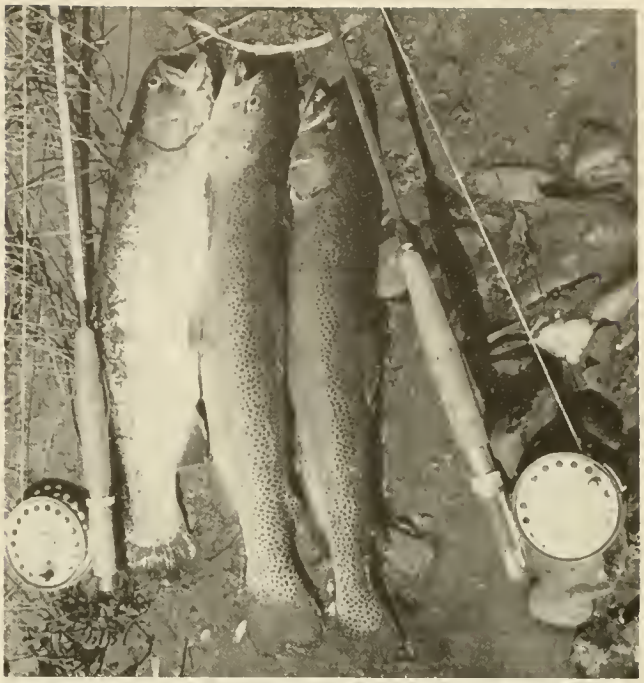
"Dick, are you sure you don't hear a roar?"

I didn't need an answer. All it took was the look on his face. Whirling around I could see a solid sheet of white in the distance. It couldn't be mere rapids. It was a dam. Neither of us knew the river and nobody ever said there was a dam on it. But on the other hand, no one had ever said there wasn't a dam, either.

From my past experience with the Corps of Engineers, I knew they might have slapped up a 500-foot dam during the winter without telling anyone. The types of dams I knew intimately were monsters like the behemoth Conowingo on the Susquehanna in Maryland which frightened me even when I fished below it.

Then began the most frantic paddling effort in the history of rowing. But the tiny paddles that came with the raft wouldn't have been enough to get us across a bathtub.

The tempo of the river picked up. We couldn't make it to either shore. All we could see was a white maelstrom drawing us quickly toward it. The term "utter panic" is too mild to describe our feelings at the time.



Like any sport, fly fishing has its experts and equipment fanatics, but beginners can still creel nice trout like these with a small investment and a few hours of practice. photo by Harmon Henkin

As I composed my epitaph, the only concrete thing I could remember about rafting was that the craft should always face straight downriver. The advice might as well have urged us to get the raft airborne.

At the lip of the dam, Dick, like W.C. Fields, decided that he would rather be in Philadelphia and started to climb out. Over the roar, I bellowed for him to get back. As he fell backward he bumped the raft hard and I was tossed out, slid down the dam face and disappeared into the whiteness.

After bouncing around on the bottom for what seemed a few thousand years, I decided the only way to survive was to push off the bottom and get back into the main current, wherever that was. Somehow I did it and felt myself rushing downriver.

I bobbed up 50 yards downstream and after breathing the freshest air I had ever tasted, the first thing that caught my eye was Dick whom I was sure had already been canonized in the Anglers' Hall of Fame. He was sitting in the raft 20 feet away, keeping pace with my downriver flow. I splashed over to him and breathlessly threw a hand on the rubber boat.

His first question was enough to make me sink to the bottom.

"Did you lose your rod?"

My answer is not fit for a family publication.

When we made it to shore and looked back at the dam, we discovered it was the biggest 10-foot dam in the universe. I have returned to that structure many times in the ensuing years and still can't believe how ferocious it seemed that day.

After I had fallen out, the front end of the raft had bobbed up and Dick rode straight through the holocaust, getting little more than a bit wet in the process.

Oh, yes, I lost my tackle box as well as my rod, and my camera had to be sent back to the factory for un-water clogging. I think it still gurgles when I use it.

Dick never suggests we go out on a boat anymore. It makes his insurance premiums cheaper.

continued

July 18—The Little Blackfoot

Boy, were they dumb!

Here they were, the Baker brothers, challenging Dick and me to a fish-out and giving us our choice of water.

We met them during the winter in a sporting goods shop where we were gossiping about the latest tackle. They were both native Montanans and dyed-in-the-wool bait fishermen. Specializing in worms, Dewey, at 25 the older Baker, claimed he could outfish any fly angler anytime—especially a couple of rookies. Dick and I had tossed fur and feather around the Midwest for a few years before coming to Montana and knew better.

The argument was one of those endless disputes that keeps sportsmen out of mischief between seasons. The only place to settle it was on the field of honor, a trout stream.

Since we were new to the area, they let us choose when and where we would go at it and set up a pair of dinners as the prize. Local fly fishermen told us that the Little Blackfoot, which flows into the Clark Fork 80 miles east of Missoula, was a good place for us to go. It is a relatively small creek about 25 feet wide and resembles the famous Michigan and eastern streams we knew well. Many of its residents were brown trout and everybody knows they love flies more than anything.

There are usually good hatches on this stream in July and the water is so clear that spinning gear is generally not favored tackle. We couldn't help snickering upon discovering that the Bakers had never fished the creek before. How could we lose?

Dick and I looked elegant after climbing into our waders and hoisting on our fancy vests loaded down with enough gear to give competition to any fly shop in the country. Between us we toted a dozen rods, matching reels, floating lines, sinking lines, lines that couldn't make up their minds what they were, untold thousands of flies and an index of miscellaneous gear that would have required a computer to keep track of.

The Bakers headed downstream carrying only spinning tackle and jars of ugly worms and we took the upstream stretch. But it took us a half hour of knot tightening and leader straightening before we could get down to the serious business at hand—choosing the proper fly. We vacillated between mayfly nymphs and floating caddis imitations, finally deciding that Dick would use the dry and me the nymph.

We fished through some of the grandest looking trout water imaginable—classic pools, long runs and a smattering of rock-coated white water. We didn't get a strike.

A conference brought us to the conclusion that our nine-foot leaders weren't long enough. We tied on lighter tippets and lengthened the leaders to 12 feet. We fished another fruitless hour. We changed fly patterns and we changed fly patterns and we changed fly patterns—nothing.

It called for a change in basic strategy. I tried sinking lines and big stonefly nymphs and Dick put on some large Bucktail streamers. Nothing. We started desperately changing flies and ideas. The hours passed and still nothing. I used wet flies weighted so heavily that if they landed on a trout it would have thought it had been mugged. Dick tried dry flies so tiny a fish needed a microscope to see them.

We used short leaders, long leaders, fat leaders and thin leaders, big rods and small rods, bright flies and dull flies, tiny flies and huge flies. It didn't make any difference. Nothing worked.

We covered miles of water and never saw a fish or had a strike—an absolute fishing disaster.

The walk back to the car at dark was conducted in silence.

The Baker boys were sitting on the grass behind a limit of 10 browns ranging from 1-3 pounds. They had been resting for an hour and had taken an hour off earlier to eat their lunch.

Dick and I ate crow that night and it tasted terrible.

Sept. 5—Rock Creek

It had been a glorious summer of fishing. I had taken at least as many dunkings as I had fish, but that was all right too. I had learned a lot and felt more confident fishing in Montana.

Rock Creek looked especially fine in early fall. The colors of the trees were glorious, the creek relatively low and clear and the fish hungry. What a great combination.

I stopped my car at a spot overlooking the stream. A hatch of small caddisflies started up in the warm sunlight. Fish started rising. Most of them were in the foot-long category, but on the far shore a bigger trout was moving. It was exciting to watch him slurp down flies in a quick rhythm.

It was so nice out I just assembled my rod, grabbed a small plastic box of flies and ran down the bank without waders or vest, one of the few times in years I had done this.

The water was deep, even this late in the year, but I carefully waded across downstream from where the trout was rising. When I got near the other bank, I tied on a small brown caddisfly and stealthily maneuvered it within 30 feet of the fish. I made a couple of false casts and then let the fly drop above its head. A split second later there was a slurp and the fly was gone. I set the hook and was onto a good fish. It jumped—a rainbow about three pounds. It jumped again and then once more before heading straight downstream past me. The fish had most of the #5 line out so I followed him, stumbling along the creek bottom. There were too many snags to let the fish have its own way. He made a big mistake and ended up in the shallows right above the rapids that probably would have meant freedom. Keeping pressure on by holding the rod tip high, I managed to approach the fish and get it ashore. I sat down on the bank and looked at it. Beautiful! It would make a fine dinner.

I waded back across the stream with rod in one hand and fish in the other, scrambling up the bank to the car. A vehicle with New Jersey plates was parked next to mine. A family inside it watched me.

A man got out and approached me.

"Gosh, that's a beautiful fish."

I nodded my head in response.

He looked down at the fast moving creek. "We're out here on vacation from the East and I'm having a heck of a time catching any fish. Are you from around here?"

I nodded my head again.

"You know," he said, "I'm considered a pretty good fisherman back there, but around here I can hardly wade, can't figure what fly to use and the trout might as well be from Mars for all the interest they show in my stuff."

Then he looked back at his wife and kids and flicked his rod a couple times. "You western anglers are a different breed."

I reached into my fly box and handed him a couple of caddisfly imitations, pointed out some likely looking spots and gave him a few tips on wading in fast water.

Before I climbed back into my car I turned to the vacationer and said in my best new western drawl.

"I reckon that the best way to fish out here is to keep on trying."

Then I quickly drove away before the old rancher who had seen me fish that barren irrigation ditch a year earlier came by and spilled the beans.

FLY FISHING PRIMER

by Harmon Henkin

More myth has encrusted around fly fishing and its equipment than anything this side of sex. And like that other pastime, fly fishing has generated an incredible amount of study, but still remains an area of abysmal ignorance for many practitioners.

In the hundred or so years since casting a fly developed into a qualitatively distinct branch of the thousand-year-old recreation of angling, it has been refined to uncanny lengths. Thousands of books have been written on every aspect of it, including whole volumes on this or that aquatic insect on which trout snack.

With the introduction of the more mechanical and well . . . ah, simple-minded spinning tackle in the 1950s, fly fishing underwent an eclipse. But today it is more popular than ever.

A good bit of technology's glitter and glamour wore off in the last decade as its total environmental and human impact became known. Many people began turning back to basics, not wishing to pay the ecological price for gadgety frills. In angling, this manifested itself with a rejection of the gimmicky spinning outfit and a rediscovery of the more basic tool—the fly rod.

It is because of recent technical advances that the horizons of the sport have broadened to include areas far from the gentle English trout streams where it began. Today, anglers with the so-called long rod comb ocean flats for bonefish and tarpon, the large tidal rivers for salmon and steelhead and lakes for deep-dwelling denizens. In Montana, almost every fish habitat can be plumbed with a fly rod despite the general notion that it is a "weapon" for mountain creeks.

However, the beginner can still be up against it, overwhelmed with folk tales and prejudices about what tackle ought to be acquired. There is an amazing amount of stuff available, but theory about its use hasn't kept pace with production. Since it takes neither more time nor more money for suitable tackle, there's no point in wasting your efforts with mismatched equipment—there's nothing that can discourage you more quickly about fly fishing. Admittedly, unlike spinning, fly fishing has little instant gratification, but the practical rudiments can be learned with a few hours instruction and practice. And, it is one of the incomparable sporting experiences.

Probably the best thing to start off with is a book on the subject, one that systematizes things simply. If you begin your practical lessons with a bit of theoretical background, you're way ahead of the game. Also, the literature of fly fishing is one of the richest and to neglect it is to miss out on much pleasure.

If you restrict yourself to one book, try Joe Brooks' "Trout Fishing." For openers it will tell you everything you need to know about the sport and it's especially good for Montanans. Other books providing a worthwhile but not quite as general an introduction include: "The Trout and the Stream" by Charlie Brooks, "Trout" by Ray Bergman, "Fishing the Dry Fly as a Living Insect" by Leonard Wright and "Matching the Hatch" by Ernie Schweibert.

But on to some basics on fly equipment.

FLY LINES

Unlike in spinning and bait casting, the pound test or break strength of a fly line is meaningless. Modern fly lines made from synthetics—nylons and plastics—are a vehicle for rhythmically casting a fly back and forth. Flies are not attached directly to these stout lines but are joined to a nylon leader, usually from 6-12 feet long. This transparent leader is what conceals the nasty intent of your fly.

The line is the most crucial element of your outfit. Many competent anglers can cast 50 feet with only a fly line and their extended arm. But without a good balanced line, no matter how elegant your rod, there isn't much you can do. If you have to scrimp on your equipment, cut corners on the rod and reel, never the line. The only two lines I would recommend are the Cortland 444 and the Scientific Angler Supreme, each of which sells for about $16. They are among the most expensive, but other lines don't seem to hold up or cast as well. Also, both of these lines are guaranteed.

Until the mid-19th century, fly lines were made from braided horse hair. They were replaced by the much more effective silk lines which, in turn, were replaced by the synthetics in the 1950s. Along with the synthetics came a new system of rating lines based on weight. (Silk lines were rated by their diameters, using a letter system with notations such as HDH.) The new method is based on the weight (in grams) of the first 30 feet of line. Weights range from an ultralight #1 for use on a couple of the most delicate bamboo rods ever made to a clothesline-like #12 for long casts, usually in salt water.

Stores sell lines according to this number system. Each rod has an optimum weight line, often written on it, that fits it best and gives it the necessary balance to cast easily.

Although some sporting goods salespersons may try to tell you that a level line is fine for beginners, don't you believe them. Even if these even diametered lines are cheaper than tapered lines, they aren't a bargain. The tapered fly line,

continued

SPRINGBOARD

"Before you begin to angle, cast to have the wind on your back, and the sun, if it shines, to be before you, and to fish down the stream; and carry the point or top of your rod downward, by which means the shadow of yourself, and rod too, will be least offensive to the fish; for the sight of shade amazes the fish, and spoils your sport, of which you must take great care."—*Izaak Walton, 1653*

FOR DISCUSSION

which transmits energy more evenly, is undoubtedly the most revolutionary development in fly tackle. Since it was developed in the mid-19th century, it has made casting a vastly simpler operation.

Beside the number designation on lines, there will be letters bordering the number on both sides. You will see something like this: *DT6F*. The first letter refers to whether the line is a Double Tapered. Other possible letters preceding the numbers are "WF" which stands for Weight Forward and "L" which denotes a Level Line. Double tapers are the traditional line for dry fly fishing. They are symmetrical—skinny at both ends and chunky in the middle. Weight forward lines are not symmetrical and are designed to get "fatter" more quickly than a double taper. They were originally made to carry a heavier fly out farther. Many knowledgeable anglers prefer them to double tapers and there are arguments on each side. It basically boils down to an angler's taste, although I usually recommend weight forward for beginners since they are easiest to cast, but not as delicate. Bug tapers, rocket tapers, salt-water tapers, etc. are variations of weight forward lines.

The letter following the number (as in *DT6F*, our example) tells whether the line is a floater (F), a sinker (S) or has a tip that sinks (F/S), usually for wet fly fishing. Further details are available from brochures put out by the various line companies or from a tackle dealer. If he can't give you sufficient details, look around for a better dealer.

Some of the wisest anglers choose the line best suited for whatever purpose they have in mind, and then pick a rod to go with it—rather than the reverse procedure. For all-around Montana fishing, a #6 weight outfit is probably the best. This is an intermediate line and you could fish small creeks, large rivers, lakes and nearly anything else you might find that's wet. It is a compromise between the lighter and heavier line outfits which are better suited for extremes of fishing conditions.

If you specialize in angling small creeks with small flies, you might wish to build your outfit around a #4 or #5 line. If you mostly fish the big rivers and lakes like the Madison, Yellowstone and Clark Canyon, you probably would prefer a #8 weight outfit to make bucking the wind and handling big flies easier.

RODS

For that all-around #6 line, an average sized person should choose a rod about 8 feet long. If you possess a smaller-than-average physique, you might want to drop down to a 7½-foot rod. If you are the brutish type, you might want to go with an 8½ footer. These are, of course, big generalizations and personal preference takes priority over angling "truths." As long as you have a balanced outfit, you shouldn't have too much trouble.

In buying a rod, all that glitters isn't gold, especially if you find it in a discount house bargain rack. As a rule of thumb, the fancier and more tinselly a rod and its wrappings are, the less of a casting tool it will be. The most expensive rods—bamboo, costing hundreds of dollars—are invariably put up with a quiet elegance.

Rods today are made from the traditional bamboo, hollow glass or the brand new graphite. For the beginner—because of price and care considerations—glass is probably best. Good bamboo, considered by aficionados to have the most responsive action, and graphites, which are a space age by-product with an incredible strength to weight ratio, will cost at least $150. A decent glass rod costs from about $50 upward, but there are occasionally some real bargains.

Such a basic rod should have some fundamental characteristics. It should have glass to glass ferrules rather than those of metal. Good metal ferrules are so expensive today that no mass-produced rod can possibly have decent ones. And glass ferrules built up from the rod blank are better than the mediocre metal variety.

The rod should have at least one guide for each foot of its length. Without enough guides, the line will slap around while casting and affect smoothness of the delivery.

Don't waste your time with the shop technique of shaking, rattling and rolling the rod harshly. This tells you zip about the rod. In fact, it's actually difficult to tell much about the capabilities of a rod without a line on it. But do check the recovery rate of the rod. Flick it once smartly. It should come back to its original position with a minimum of wiggles. A wiggly rod is invariably a bad one.

If you stick with accepted brands like Cortland, Fenwick, Scientific Angler and Winston, you can't go too far wrong, and these rods are readily available around the state.

Don't try any exotic numbers until you (and not the salesperson) know exactly what you want. That will take a few seasons of flailing away.

By the way, any decent-minded tackle dealer should have a set of reels with lines on them so you can cast a rod before buying it. If you are going to spend over $50 for your pole, that's the least he can do. You can also get a casting lesson thrown in as an extra.

REELS

That's simple. Buy any single-action reel that holds your chosen fly line and about 50 yards of braided dacron backing. The backing serves a rare, but necessary, function if you hook a monster fish which isn't satisfied with merely running off with your 35-40 yards of fly line.

Some very acceptable reels sell for about $10. The rookie should stay away from the once-popular automatics. They are heavy, have a small line capacity and seem to jam up at inappropriate moments. (There are some very savvy Montana anglers who have used them for eons, but, like religion, it's their affair.)

LEADERS

Purchase tapered leaders, from 7½-9 feet long. The tapered leader transmits the energy delivered from the line and turns the fly over. Level leaders, like level lines, just can't do the job.

One way of getting an idea of what your leader tippet or end diameter should be is the old-timer's "rule of fours." Roughly, your leader tippet measured in *decreasing* diameter size (2X, 3X, 4X, etc.) should be ¼ the size of your fly. For example, a 4X tippet should be used on a #16 fly, a 2X on a #8 fly, etc. This is a rough measure, and if you are a tippet size off, it's usually no big thing.

FLIES

Some 10,000 fly patterns are around these days and local information is the most solid guide. Under the right circumstances, each will take fish in Montana. I took a few browns one day in the Clark Fork using outsized streamers I bought in Key West for 100-pound tarpon, but I would not recommend a beginner going out with them as first choices.

A selection of flies for trout should vary according to the size of fish being sought, kind of water and time of year. Another general rule of thumb (with trillions of exceptions) is that as the season progresses, fly patterns should go from

light to dark and from large to small. But I wouldn't want to go to the wall over these choices.

The following is a list of 10 flies that are my own personal choices, if not bigoted selections, for a basic general collection:

• *Dry Flies*

Quill Gordon—#14-#16, imitates wide range of mayflies

King's River Caddis—#12-#14, imitates wide range of caddis

Gray Wulff—#10-#12, impressionist fly, good when nothing particular is hatching

Humpy—#12-#14, another good Montana impressionistic fly

• *Nymphs*

George's Brown Stonefly Nymph (weighted)—#10-#12, woven body fly imitating range of common stonefly nymphs

Wooly Worm (weighted)—#6-#8, gourmand representative of something yummy

Light Cahill—#14-#16, imitates small mayfly nymphs

Otter Nymph—#12-#14, grey nymph approximating variety of delicacies

• *Specialty Items*

Muddler Minnow—#6-#8, Sculpin Minnow lookalike, but can be fished in lots of ways

Dave's Hopper—#6-#8-#10, good hopper imitation for long grasshopper season.

TYING FLIES

by Marty Beatty

If you are the kind of person who likes to "make your own," why not learn to tie flies? Fly tying can offer many hours of relaxation as well as test your inventive ability.

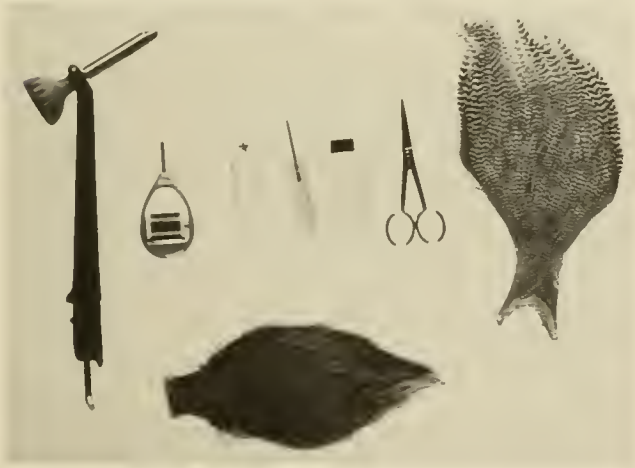
Although it costs a little to get started, most fly tying tools last a lifetime if you buy good models. Once started, fly tying costs no more than any other craft hobby—and less than some. With a little searching you can perhaps purchase used tools which are adequate for the beginner.

The most essential tool is a vise. Buy a well-made vise, sturdy enough to hold the hook tightly.

Next, buy hackle pliers which are used to wind the hackle around the fly. (A hackle is a feather that, when wound on the fly, represents the fly's legs, wings, whiskers, etc.) Hackle pliers with rubber grips in the jaws work best for a beginner.

Although you can get by without one, using a bobbin helps you make better flies. Made of either plastic or metal, a bobbin holds the spool of tying thread and allows use of a continual piece. It puts constant tension on the thread, yet dispenses it as needed. A sharp pair of scissors is another "must."

With these tools—vise, hacklle pliers, bobbin and scissors—you are ready to tie. Start by tying larger flies.



Basic fly tyng equipment: From left to right—vise, bobbin, hackle pliers, bodkin, head cement, scissors, grizzly neck hackle and (bottom) colored neck hackle. F&G photo by Tom Warren

Once these are mastered, the smaller flies won't seem so difficult. For the beginner, it's best not to tie flies on anything smaller than a #8 hook until you have the feel of the equipment and understand the basic steps.

When you go out to buy materials, start with hooks. Hook sizes vary—long shanks, short shanks, straight eyes, turned-down eyes. Better quality hooks are sharper, stronger and last longer.

Hackle comes in various natural and dyed colors and is available in small packets or in larger quantities. Natural colors include brown, white, grizzly and ginger. Dyed colors include black, blue-gray, olive, yellow and red.

The body of the fly can be made of various materials, including wool yarn, four-strand floss, chenille and peacock fiber. Different bodies can be created by using the various materials. When tying the body, keep it balanced, uncluttered and as natural as possible.

All materials are tied to the hook with nylon or silk tying thread. Silk is superior because nylon stretches. Spend a few extra cents because this thread holds all other materials to the hook. Tying threads vary from heavy to fine. A medium diameter works best for the beginner because it is sufficiently strong, but fine enough to keep the fly balanced.

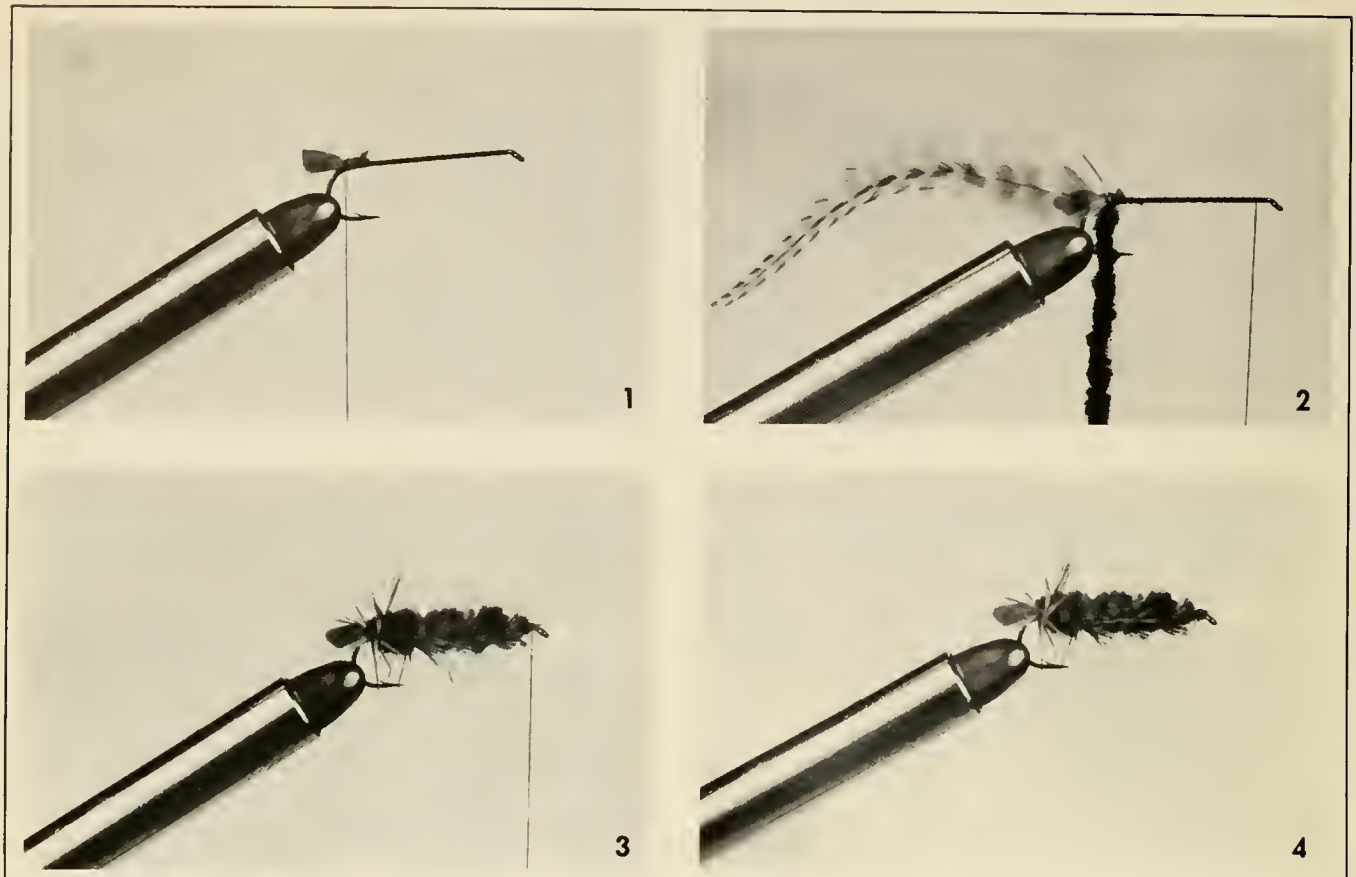
Tying thread can be purchased either waxed or unwaxed on spools. The wax acts as a cement and helps hold materials together. Buying the thread prewaxed eliminates the hassle of a cake of bee's wax and the necessity of waxing each piece of thread for a new fly. If you choose unwaxed thread, hold the wax in the palm of your hand and pull a six- to eight-inch section of the tying thread through the wax. Repeat four or five times.

THE WOOLY WORM

For a wooly worm, select a #6 hook with a 3X shank and tighten it in the vise. Take the bobbin and wrap the tying thread around the shank of the hook, crossing over the loose end of thread. (See illustrated instructions.) Wind the thread back to the bend of the hook and clip off the remaining loose end with sharp scissors. Use a small piece (¾ inch) of red wool varn for the wooly worm's tail.

Hold the yarn on top of the hook shank at the bend. Wrap the tying thread around the yarn and shank of the hook four or five times, returning the thread to the bend of the hook.

Continued



Tying the Wooly Worm: *1. A 3X hook held tightly in the fly tying vise. The yarn tail is tied to the hook with waxed tying thread. 2. Tail, chenille and hackle are tied to the hook. The tying thread is wound to the front of the hook leaving room for the head. The wooly worm is ready to be tied. 3. The chenille and the hackle have been wound on the hook leaving room again at the eye for the head. 4. After the head has been tied off with half hitches and has been cemented, the wooly worm is completed. F&G photos by Tom Warren*

Always wrap the tying thread away from you, which makes a tighter wrap.

The tail should stick out beyond the bend of the hook about ½ inch. If it is too long, the fly will look unnatural and out of proportion.

Take a piece of chenille three of four inches long. (Chenille makes the body of a fly appear thick and fuzz-like.) Assorted colors can be purchased at most sporting goods stores. Tie the chenille to the hook in the same manner and at the same place as the tail was tied. Three or four wraps of the tying thread should be sufficient.

Now we are ready to tie the hackle to the hook. Select a long but narrow hackle—long enough to reach from the bend of the hook to the eye. Tie the hackle on just as you did the tail and chenille. Again, use only three or four wraps of the tying thread.

With the tail, chenille and hackle tied onto the hook, you are now ready to create the fly.

Grasp the chenille and wrap it on the hook from the back to the front. Wrap firmly, keeping each wrap as close to the previous wrap as possible. Wrap the chenille to about 1/8 inch from the hook's eye. Once at the eye, wrap the tying thread around the chenille three or four times, catching it tightly on each wrap. Clip the loose end of the chenille as close to the shank as possible without cutting the tying thread.

Take the hackle pliers and grasp the hackle just below the tip. Always grasp the hackle crosswise with the hackle pliers. Wrap the hackle toward the front of the hook with four or five wraps. Remember, although the hackle fibers are delicate, they can still be wrapped quite tightly. Once you have the hackle at the front of the hook, catch it with three or four wraps of the tying thread. Clip the remaining hackle but don't clip the tying thread.

There are other methods used to wrap the hackle. Tie the tip of the hackle and then wrap it. Many tiers grasp the hackle at the tip and gently pull the fibers apart by stroking the feather toward the bottom. This adds to the fly's effectiveness.

Now that the chenille and hackle are tied off at the front of the hook, it's time to finish. The head is the most difficult part of the fly and many beginners tend to make it too large. That's why the space at the front of the hook is so important.

The head of a fly should taper from front to back. The taper has already been started where you tied off the chenille and hackle. Begin by wrapping the tying thread from the front to the back until the space left for the head is filled and tapered. Now tie four or five half hitches over the eye, but well onto the hook. Clip the tying thread. Carefully cover the head with cement. If it touches the hackle, the cement will harden and the hackle won't function properly. So apply cement with a toothpick or similar device.

Now that you know the basic steps, practice tying five or six wooly worms. Then move onto something else. Use imagination and skill and come up with your own pattern. If you tie during winter, when fishing season rolls around you'll have quite a selection of hand-tied flies to tempt trout on your favorite lake, river or stream.

THE CATCHALL

License Fee Increase

After considerable deliberation, the 1975 Montana Legislature finally passed S.B. 236 and S.B. 279 which raise resident and nonresident license fees. S.B. 236 also installs a ceiling of 17,000 on nonresident elk hunters.

All provisions of the new legislation go into effect *May 1, 1976,* with one small exception. S.B. 279 raises the conservation license to $1 for both residents and nonresidents *this year, effective July 1, 1975.*

The increase brought Montana closer to the desired 5:1 ratio for nonresident to resident fees. Before the legislation, it was 7.5:1. Now, it's 6.4:1.

Although most sportsmen seem to understand the need for the increase, we've received some grumbles from a few others. In effect, they say the fees are too high.

Perhaps comparing some of Montana's new license fees with those of some other western states will clarify this.

Resident deer. Arizona—$11, California—$8, Colorado—$10, $12.50, Idaho—$6, Nevada—$22.50, New Mexico—$16, Oregon—$15.50, Utah—$15, Washington—$16.50 and Wyoming—$15. Average—$17.70. Montana—$8.

Resident deer. Arizona—$11, California—$8, Colorado—$10, Idaho—$5, Nevada—$12.50, New Mexico—$7.50, Oregon—$7.35, Utah—$5, Washington—$9.50 and Wyoming $10. Average—$8.59. Montana ("A" tag)—$6 in 1976 and $7 thereafter.

Resident antelope. Arizona—$27, Colorado—$10, Idaho—$8, New Mexico—$11, Oregon—$5.25, Utah—$10 and Wyoming—$10. Average—$11.60. Montana—$5. Generally, the same comparison holds true with other license fees. So considering this, Montana sportsmen seem to be getting a real bargain.

The new license fees are listed in the accompanying table. However, a few general notes of explanation will be helpful.

(1) Sales of nonresident $225 licenses will be restricted to 17,000 per year beginning with the May 1, 1976 license year. In return for the $225, nonresidents will receive season fishing privileges, bird hunting, one deer, one elk and one black bear. This license serves as a prerequisite for purchasing grizzly and mountain lion licenses and entering drawings for sheep, antelope, goat and moose.

(2) The nonresident combination season fishing and bird hunting license for $50 also serves as a prerequisite license for purchasing deer "A" and/or "B" tags, black bear, grizzly and mountain lion licenses. This license also entitles the nonresident to enter drawings for sheep, antelope, goat and moose. The combination $50 license does not include an elk license. The only way a nonresident can hunt elk in Montana is by purchasing the $225 license.

continued

Resident Licenses	Fee
conservation	$ 1
sportsman (fishing, birds, one deer, one elk, one black bear)	35
bird	4
elk	8
deer "A"	6*
deer "B"	12
turkey	2
bow and arrow	6
grizzly	25
grizzly trophy	25
sheep	25
antelope	5
goat	15
moose	25
black bear	6
mountain lion	5
pioneer	1
voluntary nongame stamp	5
Nonresident Licenses	**Fee**
bird	$30
turkey	2
big game (fishing, birds, one deer, one elk, one black bear)	225
grizzly	125
grizzly trophy	25
black bear	50
deer (special)	50
combination bird and fish	50
antelope	50
sheep	125
goat	75
moose	125
mountain lion	25
deer "A"	50
deer "B"	50

*$7 after May 1, 1977

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(3) Youth license fees (under 18) will be $2 each for a bird license, elk tag or deer "A" tag. All other licenses will cost the same for youths and adults.

(4) The nongame wildlife stamp is strictly a voluntary license. Nongame values have become increasingly important in recent years, so here's an excellent opportunity for those who don't hunt or fish to directly contribute to the welfare of all wildlife—game and nongame, including endangered species. Previously, hunters footed the bill for all wildlife conservation.

GOOD NEWS FROM AN IDAHO GREENHOUSE

With increased strip mining looming as a virtual certainty for eastern Montana and hard rock mining proposed for several mountainous areas, one research project funded by SEAM (Surface Environment and Mining Program) may benefit wildlife.

Although SEAM funds many research programs, this one, based in Coeur d'Alene, Idaho, seems especially rewarding for wildlife. Our department has long worried about "reclamation." The word is easily tossed around, but definitions are difficult to find. One part of a successful reclamation project, as we see it, is re-establishing the diverse, native vegetation on the mined land. This is the same vegetation which now supports some of the nation's best wildlife populations.

We've continually objected to companies "reclaiming" mine spoils by establishing semi-sterile monocultures of western wheatgrass, alfalfa, winter wheat, etc. Regardless of their other merits, these crops do little for wildlife.

SEAM's parent agency, the U.S. Forest Service, is attempting to produce quality native shrubs for revegetating mine spoils. Some of the species under study in the various greenhouses are bitterbrush, chokecherry, woods rose, buffaloberry, serviceberry, snowberry, fourwing saltbush, rubber rabbitbrush, big sagebrush and other natural growing favorites of wildlife.

The technology of producing commercial timber species has, through the years, been developed to a high degree. However, research into cultivation of native shrubs and other plants is still in its infancy. We, for one, are glad to see this kind of research, and we hope the project helps make native shrubs readily available when the time comes to put eastern Montana back together again.

TAIL TALE

"Give an animal a tail and he'll find a use for it." That would have been a great quotation if anyone had ever said it, for every animal has a tail and no two use them for the same purposes.

Cows' tails are purportedly to shoo flies, and they become a defensive weapon against milkmaids who are frequently clipped alongside the chops when the cow deems it necessary. Cows are not famous for their personal hygiene.

Porcupines use their tails to drive home a point, and when they slap you, you stay slapped. Squirrels use their tails for many purposes including a bed to curl up in, as a shade when the sun is too hot and to steer themselves when jumping from limb to limb.

Beavers use their tails to shovel mud around their dams. When they are enjoying a dip in their pool in the cool of the evening and discern approaching danger, they smack the surface of the water, sending a warning to all their friends. After such a warning, not another beaver will be seen for an hour or more.

Peacocks vulgarly display their tails to win their mates, and turkey gobblers are a poor second emulating their gaudy friends. Nevertheless, gobblers win their mates without this fanciful display. It may be that they have other hidden personal charms which appeal to lady turkeys, or it may be that lady turkeys are not impressed with excessive finery and want something more substantial in a mate.

The old saying that a frog's eyes will fall out if he is picked up by the tail is not founded on fact.

Some horses pick up a bit of pocket change by selling hair from their tails to ready buyers; white horses sell their horsehair to fiddle bow makers and black horses sell theirs to magicians. The market is stable.

Cat tails—not those that grow in marshes, but those that grow on cats—are used to mesmerize birds, mice and other creatures preyed upon. Nothing is louder than a cat's tail when stepped upon.

The principal use for elephants' tails is for the following elephant to hang onto in circus parades.

Snakes' tails will not be analyzed here, because it is too hard to determine where a snake's neck leaves off and his tail begins.

Dogs use their tails to show their mood, wagged when friendly and tucked between their legs when confidence is shaken. The position of a dog's tail when he is sinking his teeth into the calf of a leg has not been recorded. More research is required on this subject.

The white-tailed deer uses his tail to distinguish himself from the black-tailed deer and vice versa.

Kangaroos are said to have learned to use their tails as the third leg of a tripod after watching surveyors set up their transits.

While not complete, this gives some idea of the uses to which animals put their tails. The pig, however, has not yet found a definite use for his. He does not use it to woo his mate as does the pompous peacock nor to steer himself when jumping from limb to limb.

And the bedbug has no tail at all, but he gets there just the same. —*D. Roscoe Nickerson*

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FISH FARMING FACTS

If you have questions about fish farming, the Catfish Farmers of America might have a few answers. The group maintains a library of information and materials available to persons interested in commercial fish farming.

Direct inquiries to 620 East Sixth Street; Little Rock, AK 72202.

Interested Montanans should be certain their ponds meet licensing requirements before committing time or money to a private or commercial fish farming venture, warns Art Whitney, administrator of the department's fisheries division. Briefly, Montana law requires that a licensable pond must (1) contain under 500 surface acres, (2) be situated on land owned or legally controlled by the applicant and (3) contain no portion of a natural stream or lake bed. Commercial raising of fish in cages which are suspended in natural waters requires prior approval of the Montana Department of Fish and Game director.

Wardens and biologists inspect all ponds (or pond construction proposals) before licensing to determine (1) if they meet legal requirements and (2) what species of fish may be approved without endangering wild fish populations. Applications for private or commercial pond licenses are available at the seven regional offices and in Helena. Private pond licenses are issued without charge from regional offices and have no expiration date. Commercial licenses are issued only from Helena and must be renewed each year.

MONTANA NATURAL AREAS

With passage of the Montana Natural Areas Act of 1974, Montana has the opportunity to establish a natural area system. Primary purposes of natural areas are:

(1) to provide representative examples of natural ecosystems,

(2) to provide opportunities for study of plant succession and other biological and physical phenomena over long periods of time,

(3) to provide "benchmark" values for monitoring changes in natural processes and systems brought about by man's activities,

(4) to serve as "gene pools" for long-term maintenance of genetic diversity and

(5) to serve as preserves for rare and endangered species.

The Montana Natural Area Committee is developing a system of natural areas which will include geologic, forest, grass and shrubland, aquatic and zoologic features.

An article entitled "Building a Natural Area System for Montana," by Wyman C. Schmidt and W.P. "Buster" Dufour, appeared in a recent issue of *Western Wildlands* (Winter 1975). The authors discuss the reasons and procedures for building a natural area system. Reprints are available, free, from: Director, Intermountain Forest and Range Experiment Station, 507-25th Street; Ogden, UT 84401.

SPRINGBOARD

"Dr. Malcolm Peterson of the National Committee for Environmental Information has pointed out that assuming the country's power needs were presently being met by 300 electric plants of 1,000 megawatt capacity taking up 1,000 feet on a side, that at continuing growth rates, *all the available land space in the U.S. would be taken up within two centuries* . . . by plants alone, leaving no additional room for transmission lines or people to enjoy the benefits of electricity." [emphasis added]—*from "Energy for Survival—the Alternative to Extinction," by Wilson Clark*

"The Lord giveth, and the Lord taketh away, but He is no longer the only one to do so."—*Aldo Leopold, "A Sand County Almanac"*

FOR DISCUSSION

WE COULD USE A FEW TIPS

Tips from an alert public are an indispensable part of law enforcement. While minor fish and game law violations usually go unreported, some interested individual often reports the more serious offenses. Sportsmen can also improve their image and landowner/recreationist relations by helping police their own ranks.

To encourage sportsmen's participation in reporting violations, the department offers pocket-sized note pads. These simple forms provide a handy means of recording facts about violations. Tipsters are rarely involved beyond the initial reporting of facts.

Obtain these pads from any game warden, regional office or by writing the law enforcement division, Department of Fish and Game; Helena, MT 59601.

GRIZZLY NEEDS "ROOM TO LIVE"

"Today, country that is high, wild and rugged—a place where birds, clear water and clean breezes blend in harmony to create a song of the wilderness—is the last hope for the 'King of American Wilderness'—the free-roaming grizzly bear of Montana."

This is the opening paragraph and main theme of a new film, "Room to Live," produced by the Department of Fish and Game Film Center. The 30-minute documentary on Montana's grizzly is narrated by George Montgomery and directed and edited by Craig Sharpe.

Sharpe says the film's primary purpose is to elicit intelligent action to maintain wildlands—a necessity to preserve the grizzly bear and related wildlife. He emphasizes, "Man's pressure on the habitat can apparently only be relieved by protecting remote regions. Without this protection, pressures to develop and utilize become unbearable for the grizzly."

The film is a result of many long hours in search of the grizzly bear

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to catch the animal in its natural state. Sharpe estimated 20,000 feet of film have been exposed with the finished project scheduled for completion in late summer.

Like all department films, "Room to Live" will be available free to schools, sportsman's clubs and other organizations.

SPRINGBOARD

"Wilderness is the raw material out of which man has hammered the artifact called civilization."—*Aldo Leopold, "A Sand County Almanac"*

FOR DISCUSSION

New Handle on Subdivisions

The 1975 legislature made several attempts to close loopholes in the Montana Subdivision Regulation and Platting Act, S.B. 208. Of these efforts, only one survived—H.B. 666, signed into law by Gov. Thomas L. Judge on April 21, 1975.

H.B. 666 amends the subdivision law to require the local governing body to disapprove any subdivision that it finds is not in the public interest. To determine the public interest, the governing body issues written findings of fact which weigh eight specific criteria: need for the subdivision, expressed public opinion, and effects on wildlife and wildlife habitat, agriculture, local services, taxation, the natural environment and the public health and safety.

H.B. 666 is not designed to stop subdivision, as critics claim. Instead, the intent is to prevent subdivisions which are not in the public interest. And at the same time, the new amendment allows local authorities to determine this on a case-by-case basis.

During legislative debate on the bill, the criteria of "need" and "expressed public opinion" were the most controversial. Opponents wanted the question of need left to the marketplace. "If the subdivision lots sell, they're needed," they argued. A definition of "need" that refers to the basic issue of whether a development is appropriate prevailed. Also, the legislature recognized the market as imperfect when external public costs are involved, such as loss of wildlife habitat.

As the local governing body considers the need for each subdivision, it now has the opportunity to assess the energy and resource implications of second home development at a time when less consumptive life styles are essential. In doing so, development can be redirected to satisfy primary housing needs within and near existing cities and towns. Whether this interpretation of "need" will be adopted by local governments remains to be seen.

Opponents of H.B. 666 seemed particularly upset about the criterion of "expressed public opinion." They claimed the popularity of a subdivision is irrelevant to its approval or disapproval. Ironically, those holding this banner also were adamantly in favor of local land use control. Grass-roots citizen participation, as provided for in H.B. 666, *is* local control. Thus, H.B. 666 provides assurance to those concerned enough to express their opinions that their views will be "weighed"—along with the other criteria—in making the final decision.

H.B. 666 at least partly originated from citizen concern over a "trend" which seemed to accommodate all subdivisions and from a need for flexible decision-making guidelines.

Perhaps the most important benefit of H.B. 666 is the improved credibility of local control. Now, the county or city commissioners must carefully determine whether a subdivision is in the public interest. This is only proper since each subdivision is an important part of the overall growth question. (See the Jan./Feb. 1975 *Montana Outdoors*.)

For the first time, the local commissioners have definite authority to deny subdivisions on the basis of wildlife impact. While we can't assess the exact toll, we know the rapid spread of rural subdivisions has had a serious impact on wildlife habitat.

A decision under H.B. 666 usually won't be made on the basis of a single criterion. Nonetheless, effects on wildlife and

MOVING?

If you're planning to move in the near future, please attach the label from your last issue and send it and your new address to *Montana Outdoors*, Department of Fish and Game; Helena, MT 59601.

NEW ADDRESS:

Name _____

Address _____

City _____ State _____ Zip _____

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wildlife habitat must be considered in writing, along with the other criteria. Many local officials have publicly declared they would like the authority to disapprove a bad subdivision. Now, thanks to H.B. 666, not only do they have this authority, but also they are required to disapprove the development if its negative effects outweigh positive factors.

Of course, what constitutes the "public interest" remains a matter of local judgment. And if local officials accept this new responsibility, a giant step will have been taken toward making "local control" more workable and effective. And if citizens actively participate in the grass-roots democratic process of determining the public interest, the bill will accomplish its stated purpose.

But if apathy prevails, the opportunity for real local control will be wasted—perhaps bringing state control closer to reality.

TO RIDE THE WIND By H. Albert Hochbaum; a Richard Bonnycastle Book; Toronto, Canada and London, England; 1973, 120 pages, hard bound, no price listed.

With the combined talents of scientist, writer and artist, H. Albert Hochbaum captures the varying moods of marsh, sky and spirit of waterfowl in his "To Ride the Wind." When Hochbaum published his award-winning books, "The Canvasback on a Prairie Marsh," and "Travels and Traditions of Waterfowl," he won for himself an enviable reputation as observer, recorder and artist. It is safe to say that his latest contribution will set a standard for years to come.

The author has had opportunities that come to few people to collect the blend of experiences he presents to his readers. For over three decades, Hochbaum resided at the Delta Marsh Waterfowl Research Station in the Canadian province of Manitoba. Here—on one of the most celebrated waterfowl marshes of the province—the author studied, boated, hunted and ruminated on the subject of waterfowl.

Hochbaum cleverly blends his numerous field experiences and impressions into a descriptive narrative of a famous marsh, its waterfowl and other inhabitants.

The author sets the initial stage of the historical time frame by taking you back to the fall of 1938 on Lake Manitoba. At this point you experience a waterfowl hunt on a cool October day. At the end of the day's hunt, you examine a mature canvasback hen that you "dusted" over a block of decoys and ask yourself many questions: Did she nest locally? How many broods did she raise over the years? Where did she winter? What were her migration patterns? Subsequent chapters answer these questions and many more as Hochbaum describes a wide spectrum of life history dynamics of such species as the giant Canada goose, canvasback, redhead, mallard, teal and scaup.

You also have a companion known as the "wildfowler" on your excursion through the numerous sloughs and open bays of the marsh. The wildfowler in reality is a mixture of one part Hochbaum and one part resident old-timer, both deeply steeped in the travels and traditions of waterfowl.

Through the wildfowler you experience the rustle of *Phragmites* reeds on a brisk spring day, the courtship display of an "old bull" canvasback in full spring regalia, the distress call of a canvasback hen as a mink scatters a brood of ducklings, the late summer shuffle of juvenile redheads testing newly acquired ailerons and rudders, practicing the canvasback "growl" in preparation for the waterfowl season and hunkering down in a canoe as a flock comes in, with flaps and landing gear down, into a set of hand-carved decoys.

The author further captures the various moods of the marsh and its waterfowl through a superb selection of 30 paintings and 40 pen and ink drawings. This additional bonus adds the final touch to this exacting and inspiring documentary. With a little imagination, one can easily transpose himself from the printed lines into an environment filled with painted skies, whistling wings and white-capped waves.

What's the best part of "To Ride the Wind?" For me, it was the last chapter, "October Evening, 1972." It's here that the reader has time to reflect on what can happen to certain species such as the canvasback and redhead over a short span of years. The reader is vividly reminded of a story that has already occurred many times on similar marshes. Hochbaum points out mistakes in waterfowl management programs. He reminds readers what a "burned out" marsh looks like, the weaknesses of the waterfowl identification system, the old and familiar Chamber of Commerce story of how "dollars in the pocket" are more important than a sound management program. He urges that steps be taken to bolster a canvasback population that has dropped from a half-million birds in 1952 to under 180,000 in 1972.

I have one criticism of "To Ride the Wind." Despite what has happened at Delta and other marshes, I felt that Hochbaum did not give credit to the hunter's important role. Hochbaum should have acknowledged that despite some of the weaknesses of waterfowl management programs, it's the hunter—through his interest and license dollars—who has underwritten the salvation of waterfowl, whose decline was not his doing, but whose resurrection was managed by his concern and support. He is the most logical agent to underwrite the salvation of waterfowl because, in the most realistic sense, he is apparently the only agent who really cares.

To close without a reference to the excellent bibliography would serve the author an injustice. The section on the canvasback as related to population decline is quite informative.

This is a book for anyone who takes the time to appreciate a remarkable documentary on waterfowl. Like fine wine that should be sipped, "To Ride the Wind" should be read slowly to fully appreciate its many merits.—*Ken Walcheck*

SPRINGBOARD

"Since then I have lived to see state after state extirpate its wolves. I have watched the face of many a newly wolfless mountain, and seen the south-facing slopes wrinkle with a maze of new deer trails. I have seen every edible bush and seedling browsed, first to anemic desuetude, and then to death. I have seen every edible tree defoliated to the height of a saddlehorn. Such a mountain looks as if someone had given God a new pruning shears, and forbidden Him all other exercise. In the end the starved bones of the hoped-for deer herd, dead of its own too-much, bleach with the bones of the dead sage, or molder under the high-lined junipers."—*Aldo Leopold, "A Sand County Almanac"*

FOR DISCUSSION

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editorial

can we afford natural regulation?

This spring, the elk populations around the northern edge of Yellowstone National Park (YNP) experienced an unusually heavy die-off. Major highways cross the winter ranges, so many by-passers and local residents had a close look at the dying and decaying elk.

Since the media has already covered many facets of this unfortunate situation, we thought we should pass along some department views on the tragedy. But first some basic information about the two separate elk populations in the area—the Gallatin herd (associated with the upper Gallatin River) and the northern Yellowstone herd (associated with the upper Yellowstone River).

Both herds spend most of the year—spring, summer and fall—inside the park. And both herds migrate out of YNP during some winters. When and for how long these elk live outside the park depends on when the winter starts, when it ends and its severity.

- *The Gallatin herd*—A large percentage of this herd's wintering area lies outside the park—Teepee Creek, the Taylor Fork of the Gallatin, Sage Creek, Elkhorn Creek, Buffalo Horn Creek, Porcupine Creek and Lodgepole-Sawmill Flats (all in the Gallatin drainage) and Bear Creek in the Madison drainage. Some elk winter in Daly Creek and other drainages inside the park.

- *Northern Yellowstone herd*—Unlike the Gallatin herd, most of the northern Yellowstone herd's winter range lies inside YNP. It extends from the area around Soda Butte in the park all the way through the Lamar Valley to and including ranges outside the park between Gardiner and the Dome Mountain area. The elk can use all or just parts of this range. In some winters, for example, few elk leave the park at all.

Vegetation is an important component of these two wintering areas. Therefore, the quality and quantity of this vegetation—especially the plants used by elk—are vital. When these plants are deteriorated (sparse in quantity and poor in quality) and when heavy snow cover and/or too many elk worsen the situation, it should be obvious to even the most casual observer that both the elk and the vegetation are in big trouble. That's what happened this spring.

This can be further complicated by the "natural regulation" philosophy. This theory holds that since the elk are in a national park, natural regulation will be the managing system. This philosophy states that starvation (sometimes called malnutrition), plant deterioration and predation are all part of a natural regulation process in a self-contained ecosystem.

But when the elk move out of the park and onto the wintering area which is a very natural and necessary part of their overall total habitat, *and which is outside the park*, the natural regulation theory apparently no longer applies. It no longer applies because these elk have left the sanctuary. But they are still on an integral part of their habitat—in fact, the *most integral part*, the winter range. When this happens, the elk and the winter range are in trouble, because the natural regulation philosophy has allowed the herds to increase beyond the capacity of the wintering area to support them.

This philosophy has been sold as *the* system in the park. But apparently, it doesn't have to function

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outside the park. Starvation inside the park is called "natural" or "expected." Outside the park, however, the same people who accepted die-offs within the park label such mortality as "mismanagement."

The public wants to feed starving elk outside the park, but inside the park, feeding is taboo. It's "unnatural." When elk increase in numbers, exceeding the food supply, both the animals and the range suffer or die. And predators don't prevent this suffering. This is a biological principle that existing literature totally supports. Artificially feeding starving, wild, free-roaming big game animals *does not solve the basic problem which is too many elk for the amount of food on the wintering area.*

An excellent article published in the June/July 1967 issue of *National Wildlife* ("The Terrible Lesson of the Kaibab," by J.B. Trefethen) applies perfectly to this situation. In the article, Trefethen wrote:

"A lesson for all. The lessons of Kaibab were bitter and were a long time in their teaching. They helped form Aldo Leopold's philosophy of game management, a keystone of modern professional wildlife techniques. They explain what happened in Pennsylvania in the early 1920s when nearly a half-million deer died in a single winter; they cast light on the perennial problem of the Yellowstone Park elk herd. They are the basis of the reasoning behind increasingly liberalized deer seasons in most states. They explain the doggedness of game administrators in Michigan, Wisconsin, and elsewhere in their efforts to expand antlerless deer seasons, often in the face of stubborn political and public resistance.

"Fortunately, our professional wildlife managers have learned the lessons well. The sportsmen and general public in most states now accept them usually without knowing their source. Those who reject them with the intent of 'saving the deer' do so at the peril of losing exactly what they most want to save."

This bull elk died of starvation along the Lamar River inside Yellowstone National Park. F&G photo by Tom Warren

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DEPARTMENT PROJECTS:

ELK AND LOGGING

—AN UPDATE—

by Terry Lonner

OUTDOOR recreation, including elk hunting, is big business and a major contributor to Montana's economy. The logging industry constitutes another large piece of the state's economic pie.

Since 1970, an average of 643 million board feet of timber has been cut annually in Montana national forests. Recent inventory of elk distribution and habitat by the Department of Fish and Game planning division shows 71% of Montana's total elk habitat (35,000 square miles) lies on national forest land. These areas provide most of the 12,000 elk annually bagged by hunters. Increasing demands for these "twin products" of the same limited land base indicate a definite need for guidelines and objectives to insure maximum compatibility between elk and timber management.

To avoid unresolvable conflicts, several agencies in 1970 began studying effects of logging and roads on elk populations in western Montana. The Department of Fish and Game; the Northern Region and Intermountain Forest and Range Experiment Station, U.S. Forest Service; the School of Forestry, University of Montana, and the Bureau of Land Management, Missoula District, are participating in the cooperative research program.

The study will (1) determine specific ecological requirements of elk, (2) determine effects of logging and roads on elk populations and (3) provide guidelines to forest and wildlife managers to insure maximum compatibility between timber harvest practices and elk management. The eight study phases, agency and individual responsible and specific objectives and status of each study are as follows (study locations are illustrated in Fig. 1):

• *Burdette Creek-Deer Creek*—Intermountain Forest and Range Experiment Station, Dr. L. Jack Lyon. Determine the environmental requirements and impact of logging on an elk population in an unbroken forest area of western Montana. The study is in the post-logging phase.

• *Long Tom Creek*—Department of Fish and Game, Terry N. Lonner. Determine the environmental requirements and impact of logging on an elk population in a scattered forest area of southwestern Montana. The study is in the pre-logging phase.

• *Sapphire Divide*—School of Forestry, University of Montana, Dr. Robert Ream. Determine the environmental requirements and impact of additional logging on an elk population inhabiting an already partially logged area. The study is in the post-logging phase.

• *Chamberlain Creek*—Bureau of Land Management, Missoula District, Richard Ellison. Determine the effects of several timber management practices on elk use (forage and cover relationships) within a previously undisturbed summer range. The study is in the pre-logging phase.

• *Ruby Road Closure*—Department of Fish and Game, Terry N. Lonner and Eugene O. Allen. Determine changes in hunter distribution, elk behavior and harvest resulting from closing a road system. Preparation of the final report is under way.

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photo by Jerry Manley

photo by Paul Bushaw

• *Judith Road Closure*—Intermountain Forest and Range Experiment Station, Joe Basile. Determine changes in hunter distribution, elk behavior and harvest resulting from closure of a logging road system. Preparation of the final report has begun.

•*Spotted Bear*—Spotted Bear Ranger District, Flathead National Forest, and the Elk-Logging Study Research Committee. Prescribe and demonstrate management practices to improve Spotted Bear elk habitat by timber management and harvest. Recommendations are being prepared.

• *Elk use of disturbed areas*—Intermountain Forest and Range Experiment Station, Dr. L. Jack Lyon. Determine and describe elk utilization of forest cover in areas already logged west and east of the Continental Divide. The study is ongoing.

GATHERING INFORMATION

Research methods used in the various study areas include: gathering information from game checking stations, measuring and recording vegetation in an area before and after it is cut and conducting seasonal and annual elk pellet counts to determine distribution, movement and cover use patterns before, during and after logging. Other methods utilized include ground and aerial observations of elk to provide additional information on distribution, behavior and herd structure; observing neck-banded and radio-tagged elk to determine movements, habitat use, behavior, home ranges, distribution and response to logging and human activity, and using time-lapse photography to quantify elk use of specific locations.

RESEARCH FINDINGS

Since the cooperative elk-logging study began in 1970, many facts and figures have been gathered, sifted and analyzed. The following section summarizes findings presented for management consideration.

During road building and logging, elk moved—sometimes as far as four miles—to surrounding ridge lines and adjacent drainages. The distance moved depended on size of drainage, area encompassed by logging, intensity of activities and degree of disturbance on the ridge lines. This displacement may be temporary.

Elk preferred to cross roads through dense timber where visibility is low and security high.

This study, and other recent studies in Montana and other western states, showed that roads and human use of those roads disturbed elk. The extent of disturbance depended on intensity, type and season of use, as well as topographic features and vegetative cover patterns. Findings from the Judith and Ruby Road Closure phases of this study illustrate how this disturbance varied.

The Judith Road Closure study indicated little or no change in elk distribution or harvest due to the travel restriction. Apparently, road closures were unnecessary to "protect" elk under the existing hunting pressure, pattern of terrain and vegetative cover. This area contained large expanses of unbroken timber with few natural openings, although clearcut logging opened up much of the timber canopy.

On the other hand, the Ruby Road Closure study indicated the closure restrictions significantly affected elk distribution, harvest and hunter use of the area. Open, scattered forest with gentle terrain and easy access both on and off roads characterize the area. Elk stayed in the restricted access area longer and in greater numbers than in the preclosure years, resulting in more uniform season-long hunting pressure and elk harvest. Thus it appeared that the road closure restrictions enhanced the security of the area so it could "hold" more elk longer. During both of the studies—Judith and Ruby—hunters saw more elk under the restrictions and seemed to prefer limited access because of the "higher quality" hunt it provided.

Within the various study areas, findings indicate elk, while on their late spring, summer and early fall ranges, prefer sites at the head of drainages bordering streams or marshy meadows, or occupying moist hollows or benches. These moist areas are especially important when interspersed with certain habitat types or vegetation associations.[1]

Study of several clearcuts west of the Continental Divide indicate elk select and use clearcuts with specific characteristics. Elk tolerance to clearcut size increased from less than 20 acres where down timber in the surrounding uncut forest was a hindrance to movement, to nearly 100 acres where the surrounding forest was free of down timber. In larger clearcuts, elk use was also influenced by the height of vegetation, with low use of bare clearcuts and increasing use as vegetation height approached five feet. These preferences for certain clearcut characteristics should not be interpreted as beneficial to elk. In fact, increased elk use concurrent with increases in vegetation height in larger clearcuts may indicate a preference for the uncut forest. Further research should help clarify this point.

ELK MANAGEMENT RECOMMENDATIONS

So management can utilize study results before project completion and final reports, the research committee has thus far formulated five management recommendations or guidelines.

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[1]West of the Continental Divide these moist sites are generally found within the Subalpine Fir/Woodrush (Menziesia phase), Subalpine Fir/Queen cup beadlily, Subalpine Fir/Smooth Menziesia, or Subalpine Fir/Sweet-scented bedstraw habitat types. East of the Continental Divide these moist sites are usually found within the Subalpine Fir/Bluejoint grass and/or the Subalpine Fir (Whitebark Pine)/Grouse whortleberry habitat types. These 6 habitat types identified as important for elk are from a total of 58 Montana forest habitat types described by Pfister, et al. in their publication, "Forest Habitat Types in Montana," May 1974.

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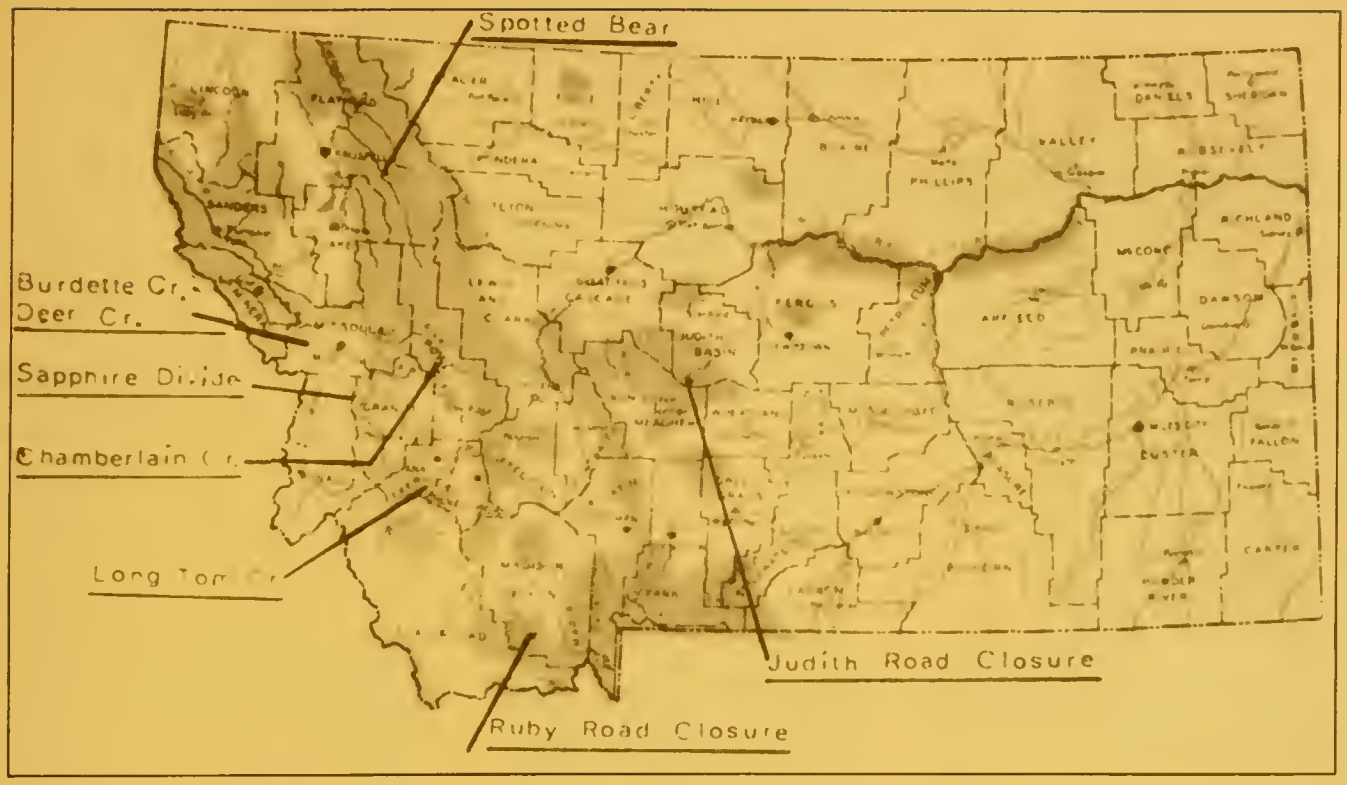

Figure 1—Montana elk distribution (1970) and location of the cooperative elk-logging study areas.

(1)—Planning for timber sales in elk summer range should include provision of a security area immediately adjacent to the disturbed area during the active logging and/or road building period. The area should provide a line-of-sight barrier and be inaccessible to motorized traffic. In some instances, this may be accomplished with an area closure. The actual size of the security area should be determined by on-the-ground consultation between wildlife and timber managers. To realize the full value of this recommendation, the ridge line between timber sale activities and the security area should remain intact, with roads and logging activity below the skyline.

(2)—During the location and design of transportation systems, existing elk movement patterns and probable elk crossing areas should be identified and provisions made to provide security for unimpeded movement. Where possible, several alternate routes should be considered. Primary consideration should be given to: maintaining frequent dense cover areas adjacent to the road; minimizing cuts, fills and right-of-way clearings; avoiding long stretches of straight road, and providing adequate slash disposal along rights-of-way.

(3)—Moist sites (wet sedge meadows, bogs, seeps, etc.) have been identified as a very important component of elk summer range.[2] Preferred summer elk range exists when these moist sites are interspersed with other necessary habitat components including various timber types and densities; dry, broken and open parks, and other physical characteristics. Where these situations exist, an area large enough to maintain the overall integrity of the habitat components should be managed by protecting them from alteration. The size of the area to be managed should be determined by an on-the-ground inspection by land and wildlife managers and other appropriate resource specialists.

(4)—Wildlife managers should identify local area elk requirements to be used as a basic consideration in every road system plan or road management decision. Proposed road systems should be evaluated for impacts on elk on a case by case basis. Existing roads should be evaluated to see if abandonment or closures would enhance elk management. Off-road vehicle (ORV) closures should also be considered and federal land managers should assess the suitability of the new federal ORV regulation in this connection. State regulations may also apply to ORV use.

(5)—Before a vehicular closure is considered, the elk management goal or objective must be scrutinized and clearly defined, being especially cognizant of the following situations or potential problem areas. It appears that closures will generally: change the relative quality of elk hunting in the closed area, reduce harassment of game animals and present some problems because of increased

[2]These moist sites are especially important when they occur in the *Abies lasiocarpa/Calamagrostis canadensis* and/or the *Abies lasiocarpa (pinus albicaulis)/Vaccinium scoparium* habitat types in eastern and central Monana, and the *Abies lasiocarpa/Luzula glabrata* (*Menziesia* phase), *Abies lasiocarpa/Clintonia uniflora, Abies lasiocarpa/Menziesia ferruginea* and *Abies lasiocarpa/Galium triflorum* types in western Montana.

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difficulty for hunters retrieving bagged animals.

Road closures may be good or bad depending on the elk management goal or objective for a specific hunting unit or area. Depending on terrain, existing access and patterns of cover, effects of area closures on elk management could apparently vary: from no change in hunter participation to a significant change; from no change in elk distribution to a significant change, with elk staying in an area longer and in greater numbers, and from no change in elk harvest to an increase or decrease, with a more uniform season-long harvest; hunters will usually see more elk per unit of walking effort.

These recommendations are by no means the "last word" or an attempt to dictate management practices to public agencies or private corporations. However, they are a part of the wildlife input that should be evaluated, along with many other values and inputs, in planning timber sales and road construction projects. Furthermore, guidelines alone will not automatically result in compatible resource management programs. After recognizing the interrelationships between elk and forested land, timber and wildlife managers must work cooperatively toward management programs which fulfill the needs of both. This is not to say that timber harvest in Montana will be delayed, cancelled or curtailed. But the policies dictating the wheres, hows and whens of timber management could be modified as a result of this study.

OVERALL VIEW

The apparent conflict between elk and timber management is but one small expression of the current worldwide problem of economics and natural resource utilization. To better understand the elk-logging problem, it may be helpful to examine the situation in a broader perspective.

Utilization of natural resources is necessary to maintain a stable or growing economy which, in turn, may enhance our standard of living—and indeed it has. Demands for an excessive life style, coupled with a growing population, have resulted in massive exploitation of our natural resources.

The liberal philosophy of the western world seems to be that man should be able to do what he desires, providing he does not harm others or himself. The continuation of this philosophy seems somewhat suicidal considering a statement made by the prominent economist, Kenneth E. Boulding, "If the whole world developed to American standards overnight, we would run out of everything in less than ten years." Even if this figure were 100 years it would still be a shocking statement. Unfortunately, this exploitation has not come without environmental consequence, a large part of which is environmental degradation, often in the form of habitat loss for wildlife.

Many societies attempt to suppress this degradation with government regulation and various kinds of gadgetry. Many persons are also changing their attitudes and expressing a willingness to sacrifice some production and consumption for aesthetic values. Government regulations and anti-pollution gadgets won't solve the problem; neither will a different attitude by society—but both will help soften the impact of an ever-growing and consuming human population.

As Paul W. Barkley and David W. Seckler wrote in their book, "Economic Growth and Environmental Decay—The Solution Becomes the Problem," "If an adequate level of environmental quality is to be restored and maintained, some conventional economic commodities will have to be given up. If the freedom to choose the kind of environment in which people want to live is to be preserved, the freedom of choosing to destroy (*alter*) the environment must be curbed" [italics added]. As a result of notions like this, many Montanans are concerned about the rate and methods of our natural resource exploitation. We are attempting, in various ways, to "curb" this freedom of choosing to alter or degrade our outdoor environment.

Montanans have inherited the natural amenities that surround us (wildlife, forests, fresh air, solitude, clean water, scenic grandeur, etc.). We have benefited immeasurably from products of national and international economic growth, ranging from precision fiberglass fly rods to Boeing 747s and highly sophisticated computers, but we are comparatively removed from the problems of industries which produce such products. In other words, we've enjoyed having our cake and eating it too. How long can this last? The immunity is beginning to wear off and we are faced with important decisions that will have far-reaching and irreversible implications.

We have a moral responsibility to conserve our natural resources and a quality outdoor environment can be an important by-product. However, our ultimate responsibility is to accomplish these ends so they will not only benefit the maximum number of people alive today, but also future generations. Whether we like it or not, this means society—and individuals—must make sacrifices and trade-offs.

In Montana, we cannot ignore the demand for elk hunting or any other outdoor recreation any more than we can ignore the demand for timber, coal, hydroelectric power, etc. We are not going to stop cutting trees, mining coal or maintaining hydroelectric dams, at least not in the foreseeable future. And hopefully we won't have to stop hunting elk. Since the conflicts exist, we must try and work *with* them, optimizing the allocation of resources upon which all depend.

Research efforts such as this cooperative elk-logging study, followed by implementation of research findings by professional and cognitive resource managers, can go a long way toward allowing us to continue "having our cake and eating it too."

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THE GAS COMPANY'S PIPE DREAM

by Mike Aderhold

illustrated by Donita Sexton

Man's demand on the earth's resources and his ability to locate and develop those resources has been devastating to wildlife. Whether we realize it or not, virtually all our exploitation impacted one or more wildlife species. Sometimes this impact was direct and very obvious. On other occasions, it was an indirect, cumulative impact that wasn't visible until years after the original development.

Until recently, resources such as coal, timber, oil and gas were "high graded," with disruption of associated resources such as wildlife remaining relatively minor. Many ores came from rich veins, timber from accessible virgin stands, oil from convenient wells, etc.

After the "high grading," demands did not diminish. The cost—including the adverse impact on wildlife of getting those resources—now escalates wildly. An excellent example is the resource investment required to bring oil and gas from the North Slope to the consumer.

This project is relevant to us not only because it crosses a portion of Montana but also because it affects the wildlife resource of this nation in virtually unimaginable ways.

The article that follows describes the pipeline from the North Slope to the lower 48 states. The immense quantities of energy and material committed to its construction all come from someplace, diminish wildlife in the process and feed an energy addiction that remains a cornerstone of our economy and life style.

As this project is conceived, grows, fuels, depletes, diminishes and dies, as it must, it will affect a wide variety of animal species on an entire continent. As they always have, these co-inhabitants of earth with man will fade in silence . . . not one audible scream, moan or sigh. We will continue to race machines in circles, ride to work one man per two-thousand-pound machine, sit with thermostats above 70° and go for Sunday drives. Think of that when you read the following article—that's what it is all about—that's why we are concerned and involved.

In that involvement we recognize Montana's need for a gas resource flowing through and into the state. We are also aware of Senate Joint Resolution 9 (passed by the 1975 Montana Legislature) which seeks a distribution point in Montana.

With this article, we hope to encourage an awareness of the total impact, including wildlife. Then, the final decision can contain consideration and compensation for wildlife and the judicious use of a very costly resource, natural gas.—Ed.

Even before the trans-Alaska pipeline question was settled in the fall of 1973, the U.S. Department of State was negotiating with Canada for a pipeline route south. It is now clear that during the height of the Alaska pipeline debate it was not a case of an Alaskan route or a Canadian route, as many believed, but one of *both*—an Alaskan pipeline *and* a Canadian pipeline.

Along with a great deal of oil, Alaska's North Slope contains vast reserves of natural gas. Prudhoe Bay alone has over 26

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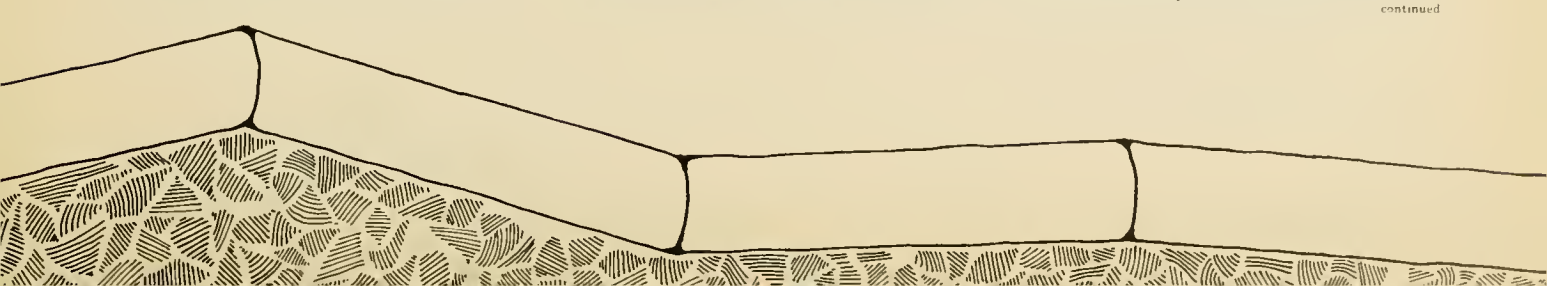


trillion cubic feet and Canada's Mackenzie Delta another 7 trillion cubic feet—or a total of *33 trillion cubic feet of natural gas.* (That's roughly equal to 36.5 times the record volume of Fort Peck Reservoir or 419 times the record volume of Flathead Lake.)

This natural gas and its transportation to the energy short midwestern and northeastern United States is the subject of an ambitious plan to construct a *4,000-mile pipeline* from Prudhoe Bay to Delmont, Penn., 20 miles east of Pittsburgh.

Two huge consortiums are planning and may construct this project. The 24-company Canadian Arctic Gas Pipeline Co. has already spent over $60 million on feasibility studies and applications. They are planning a 48-inch line from Prudhoe Bay 195 miles east to the Yukon border, (162 miles of which bisects the Arctic National Wildlife Range). From the border, the line continues east to the Mackenzie Delta, then runs south over 2,000 miles to a terminal near Monchy, Saskatchewan, 40 miles north of Malta, Mont. Midway through Alberta this line will join the existing 2,000-mile Trans-Canada Natural Gas pipeline to Montreal and eastern Canada.

From the U.S. border east, Northern Border Pipeline Co. is planning the line. Initial plans call for a three-phase pipeline construction. A 1,061-mile, 48-inch line and a 75-mile, 42-inch line will run from Montana to Kankakee, Ill. From there, the line will be reduced to 36 inches and extend 305 miles to west central Ohio where it will tie into the existing Columbia Gas transmission line. From there, the original line will be further cinched to 26 inches and run 176 miles to Delmont, delivery point for the Texas Eastern Transmission Corp.

The pipeline will cross 11 states and through existing pipelines, the gas it may carry will eventually be transmitted to over 23 states. From Montana to Pennsylvania, the line extends 1,619 miles. With a 100-foot right-of-way, the U.S. portion of the project alone will require 19,626 acres, most of which will be disturbed by construction. A strip 40 feet wide or 40% of the right-of-way (7,850 acres) will be permanently kept clear of trees and brush. Wherever practical, the line will be buried in a ditch 7 feet deep, 8 feet wide at the top and 5½ feet wide at the bottom. Gravel and sand will cushion the pipe in the absence of soil. Thirty compressing and chilling stations will keep the gas liquefied and flowing at 1,680 pounds per square inch and 10-30° F. To coordinate transmission along the U.S. portion of the line, 88 microwave transmission and reception towers will also be constructed. The Canadian portion will have 41 compression stations and over 100 transmission towers.

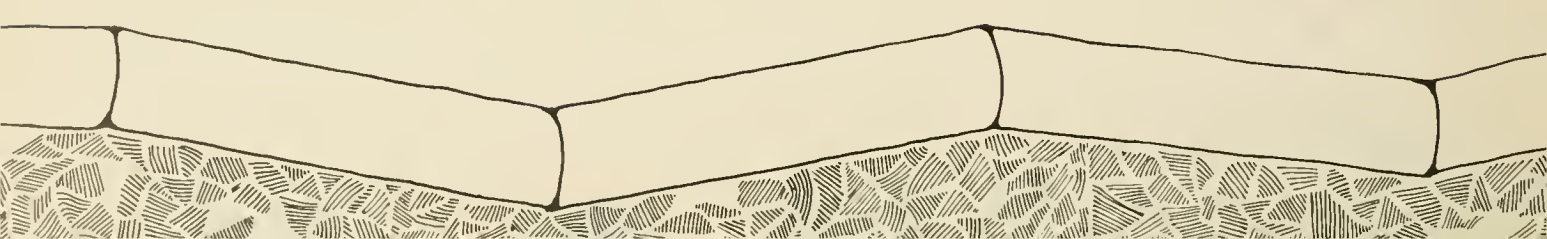
Information on the material and equipment requirements for the whole project is unavailable at this time. However, Ecology and Environment, Inc., a consulting firm based in Washington, D.C., has estimated for the Northern Border Pipeline Co. that the U.S. portion of the line will require 1,435,000 *tons* of pipe, over 11 million gallons of diesel fuel, over 5½ million gallons of gasoline, 3,820 55-gallon drums of lube oil, close to 32½ tons of grease and an astounding 3,900,000 pounds of welding rod. The projected equipment requirements are almost as surprising: 80 crawler tractor units, 42 units of major earth-moving equipment (i.e., scrapers, ditchers, draglines, etc.), 51 truck-trailer units, 73 trucks in the ½-5 ton class, 34 trucks in the 5-16 ton class and 24 welding units. And this is merely for the U.S. portion.

The Canadian portion of the project, roughly a third longer, will require the mentioned materials and equipment plus at least a fourth more, according to an article in the Dec. 18, 1974 *Environmental Action.* At the height of construction, the U.S. project will directly employ about 4,100 people and after completion require an operation and maintenance crew of about 200, according to the Washington consulting firm. Initial planning reports indicate a 1977 starting date, completion of the entire 4,000-mile line by 1981 and operation by 1982.

The requirements are interesting and impressive and they help one appreciate where the $9-10 billion price tag comes from. They also give an insight into the raw material price, the crude oil needed, the amounts of steel-making material required and the human effort involved in drilling, mining, manufacturing, transporting and laying this line. Unfortunately, all of this sheds little light on the environmental costs.

To see what could happen in Montana, private, federal and state biologists have sifted through 20 years of related wildlife observations. They have flown the route, studied aerial photos and field inspected many sections along the proposed 180-mile route through the state.

The line in Montana will junction with the Canadian Arctic Gas pipeline near the border, north of Malta, and run diagonally southward 180 miles through Phillips, Valley and Roosevelt counties to the North Dakota border about a half mile south of U.S. Highway 2. Of the 180 miles, 102 miles cross public lands—18



administered by the Bureau of Land Management (BLM) and 84 miles through the Fort Peck Indian Reservation administered by the Bureau of Indian Affairs (BIA). Montana construction will involve 2,182 acres for the pipeline, plus an additional 100 acres for 5 compressor stations and 24 acres for 6 communications towers. About 98% of the route crosses agricultural land, 52% or 1,150 acres of rangeland and 46% or 990 acres of cropland or pasture. The remaining 2% of the route crosses flood plains, streams, wetlands and highway and railroad rights-of-way. It has been estimated that the pipeline will cross land now producing a yearly average of 10,000 bushels of wheat and barley and 250 tons of hay. Construction will probably affect at least one-half of this production, according to figures from the U.S. Fish and Wildlife Service.

The grading, trenching and use of heavy equipment will have a more lasting effect on the rangeland. Scraping and grading will destroy at least 1,000 acres of native prairie. Future brush and tree control will prevent about 650 acres from ever returning to its original state. The line will cross 150 acres of coulee habitat, 120 acres in gullies and swales, 11 miles of scattered hilltops and grass ridges and 20 acres in trees, all with unknown but definite impact. The route in Montana alone will cross 195 waterways—or 186 intermittent streams, 2 drainage ditches, 6 creeks and the Poplar River. Erosion control will be necessary at every crossing.

In the high plains section of Montana—often referred to as barren and sometimes inhospitable—researchers have so far identified along or near the proposed route: 103 plant species, 50 different birds, 37 fish species, 31 mammals and 5 species of reptiles. Dispersion, nest destruction, accidental mortality and habitat losses due to the alteration of 2,300 acres will affect all these species to some degree. The line will disturb and possibly destroy 147 acres of wetlands and 51 temporary potholes. The line will destroy 165 acres of known key antelope winter range and sage grouse concentration areas.

Some valid reasons and good arguments exist for bringing Alaska's natural gas south. There are also some good arguments for using a pipeline. But it is clear some important questions should be answered before construction.

(1) Canada is a good neighbor and probably our country's closest friend philosophically and economically. Will this project compromise our relationship? What happens when the resource begins to run out (and it will) and both Canada and the U.S. need and want what is left? Will this pipeline become another Panama Canal?

(2) The pipeline will be designed to carry 4½ billion cubic feet of gas daily. If that figure and the figure of 26 trillion cubic feet for the gas reserves of Prudhoe Bay are accurate, then the gas will be pumped out in 16 years. Then what? Even if twice as much gas was found as expected, it would last only 32 years. What kind of energy solution is that? Isn't the use of 6 billion pounds of steel to move a 20-30 year supply of gas the same sort of thinking that got us into the energy shortage to start with?

(3) The estimated cost of $9 billion at today's prices is also suspect. This figure may be $14 billion by 1982. Both figures are tremendous and it is tempting to ask if there isn't a more permanent use of that money. What about the annual operation and maintenance costs? Gas shipped at that price will not be cheap. It will cost more than any natural gas we are now buying.

(4) The tremendous petroleum and steel-making resources required are not renewable. Once committed or consumed, they are lost. This cost should be balanced by clearly defined and equally valuable benefits.

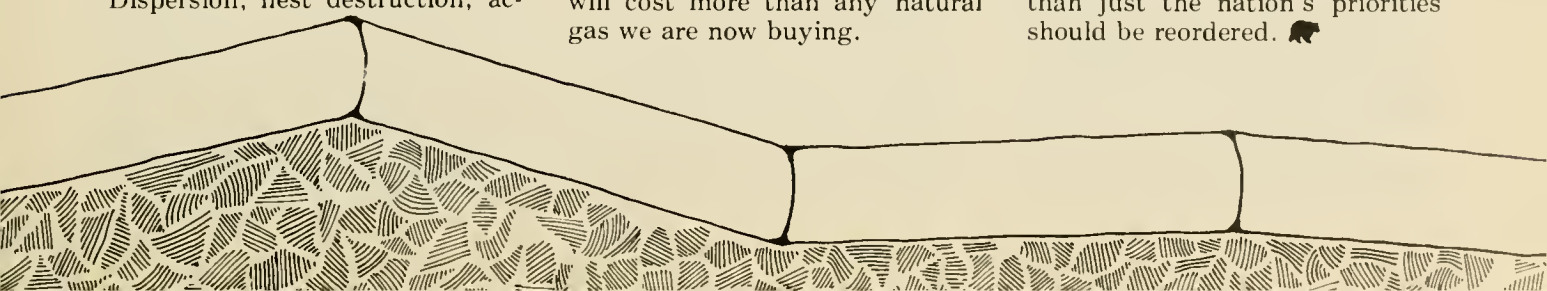
(5) Environmental resources so committed are likewise lost. Virgin tundra, spruce forests and undisturbed prairie are irreplaceable.

(6) What about gas line safety? What does 4½ billion cubic feet a day of gas under 1,680 pounds of pressure per square inch do to a 48-inch pipe? What safety provisions will be taken?

(7) What benefits will Montanans receive for their 2,300 acres and the disturbance this project will cost? How will this project help find jobs, lower the cost of living or enhance the quality of life?

This project has been called the largest ever undertaken by private enterprise. Even so, it is receiving a great deal of governmental encouragement. It is a vital part of the current national energy plan, Project Independence. Department of the Interior sources say that in-house memos refer to it as "Presidential Priority No. 2," second only to eastern seaboard off-coast oil exploration and drilling. Interior's fish and wildlife section, the Ecological Services Division, is responsible for writing the environmental impact section for the Northern Border Pipeline Co. environmental impact statement.

So, support for the project appears to come from high places. But animal species on an entire continent will be adversely affected. A huge investment of nonrenewable resources and materials will be required—all to fuel a flash-in-the-pan answer to energy shortages. Perhaps more than just the nation's priorities should be reordered.



THE TRUTH ABOUT SNAKEBITE

by Dr. Donald E. Espelin and Vern Craig

Probably no other group has been as imaginative in devising treatment for rattlesnake bite as writers of western fiction.

With polka-dotted bandanna knotted tightly about an arm, the alkali-dusted pulp paper hero would sterilize a knife in the open flame of a sagebrush fire. Unflinchingly, wounds were cut in the arm around the bite and the poison "drawn out." Then came the finale—the part with imagination. Wounds were quenched with white-hot branding irons, seared with powder from .44 cartridges, packed in the healing mud of mineral springs or swathed in magical herbs known only to Indian witch doctors. Whiskey, the universal pain killer, was taken liberally before, during and after the ceremonies and sometimes splashed on for good measure. To the best of my knowledge, a western magazine hero was never lost to snakebite.

Whatever treatment early westerners actually used for snakebite, their mistakes are certainly excusable. Little was known about the chemistry of snake venom and little research or record established any precedent for uniform treatment.

Historically, the treatment of snakebite has been surrounded by witchery and mysticism. It was not until the late 1600s that an Italian, Redi, demonstrated that venom, not enraged spirits, oozed from the fangs of vipers. Even today, knowledge about the highly complex nature of snake venom isn't complete. There has been, however, enough good research and sufficient clinical information gathered to establish a uniform treatment for snakebite. There is no longer any excuse for ill-advised treatment, some of which may do more harm than good.

With but one exception, the poisonous snakes native to the United States are pit vipers. The name applies to a small "pit" below each eye of these snakes. The pits lead to what are apparently heat sensitive organs instrumental in directing a snake's strike. The pit viper family includes rattlesnakes, cottonmouths and copperheads. One or more kinds of pit viper inhabits all of the contiguous 48 states, except Maine. The other poisonous snake is the coral snake which inhabits southern states from Florida to southern Arizona, New Mexico and Texas.

In Montana, the only poisonous snake is the prairie rattler which bears the Latin name, *Crotalus viridis viridis*. By most standards, our prairie rattlers aren't large. They're no match in size or lethalness to the eastern diamondback, the Texas diamondback or even the timber rattler which ranges over much of the eastern United States.

Most Montana outdoorsmen know the spine-chilling whirr of the aroused rattler. The prospects of having those venomous hypodermic-like fangs driven into one's flesh is unnerving to contemplate.

The prairie rattlesnake. photo by Stan Coman

Fortunately, the incidence of snakebite is low. There's no ready source which indicates how many persons have been bitten in Montana over a given period, but the Department of Health and Environmental Sciences' records and statistics bureau shows one death attributed to snakebite from 1960-1974. During the same period, three deaths resulted from bee stings.

Some authorities estimate that 2,000-3,000 venomous snakebite accidents occur every year in the United States, but only 10 or so deaths. The highest death rates are reported from Arizona, Florida, Georgia, Texas and Alabama, respectively.

Rattlesnakes account for 75-85% of all human deaths from snakebites and the bulk of these fatalities includes persons under 15 and those 50 or older. The eastern or Florida diamondback is North America's largest and most dangerous reptile, with the Texas diamondback running a close second. Both are considered among the world's most venomous snakes.

Rattlesnakes do most of their moving around at night. Given the chance they'll usually crawl away or rattle when alarmed, they will sometimes strike without apparent provocation and without warning. The strike is a lightning-quick stab. During a strike, the snake's mouth flies open wide and the fangs stick out like needles. One or both fangs may puncture the flesh. Rarely does a snake eject all its venom in one strike. It may strike

continued

a second time, or even more, and eject venom each time. Since snakes can effectively strike only about one-half their body length, it's understandable that most bites are suffered on the arms, hands, legs and feet.

When someone is struck by a rattlesnake, there's no immediate way to determine just how serious the situation might be. Some burning pain usually occurs immediately, but in other cases pain may not be felt until hours after the bite. Severity of pain does not necessarily indicate severity of the poisoning. So, each bite must be considered serious and potentially fatal. Seriousness of a bite depends on how deep the fangs penetrated, which part of the body is bitten, size of the person and size and individual characteristics of the snake.

The fangs of most adult rattlers are long enough to drive through skin into underlying muscle. The amount and type of the victim's clothing, accuracy of the strike and size of the snake determine how deeply the bite goes. Bites on the head, neck or trunk are generally more dangerous than those on arms or legs because the venom is absorbed into the system faster. As a rule, the smaller the body of the person bitten, the more serious the case. The need for treatment is especially urgent in children. Size of the striking snake will have a bearing on the severity, too, because larger snakes are capable of carrying larger amounts of venom. Toxicity, or potency of venom, will vary from one snake to another, regardless of size.

For clinical classification of the severity of snakebite, the following gradations are used:

Grade O—presence of fang wound or wounds, but no signs of poisoning;

Grade 1—fang wounds, throbbing or moderate pain localized at wounds, swelling extending not more than a few inches from the bite, after 12 hours no evidence of systemic involvement;

Grade 2—in addition to the symptoms in grade 1, more severe pain and more severe and widespread swelling progress toward the trunk (usually about halfway) in the first 12 hours; nausea, vomiting, dizziness, purple or crimson spots in the skin and dark discoloration under the skin in the area of swelling, usually a slight temperature which persists one to four days;

Grade 3—may at first resemble grades 1 and 2, victim may be in shock within a few minutes after the accident, symptoms progress rapidly, swelling may involve bitten limb and part of trunk within 12 hours, discolored spots on the skin and discoloration under the skin may be general over the body; during the first 12 hours, the pulse becomes rapid and weak, temperature below normal, patient approaches shock. Other symptoms that may accompany snakebite are temporary blindness, cold sweating, paralysis and convulsions, especially in children.

Until recently, the method of snakebite treatment was largely mechanical—it was all that was available. Some remedies were worse than no treatment at all. Even now, there is much misinformation and contradiction regarding snakebite treatment. Let's take a look at some mechanical methods of snakebite treatment in light of present knowledge. The old stand-bys were tourniquets, incision and suction and chilling with ice.

If a snake bites deeply enough to penetrate muscle, then a tourniquet would have to be so tight that it cut off the blood flow in order to slow the spread of venom. *When the blood supply is cut off to a part of the body, that part of the body dies.* A tourniquet applied tightly enough to cut off the blood supply should be used only in the full knowledge that the limb may have to be sacrificed. Ill-advised use of tourniquets has resulted in loss of untold numbers of limbs.

McCollough and Gennaro reported in the June 1963 *Journal of*

FIRST AID FOR SNAKEBITE

If medical aid is available within 4 hours:

1. Place the victim at rest.
2. Completely immobilize the part of the body that has been bitten.
3. Transport the victim immediately to medical help.

If medical aid is more than 4 hours away or the envenomation appears catastrophic:

1. Place the victim at rest.
2. Completely immobilize the part of the body that has been bitten.
3. Apply a lymph constriction band (preferably a flat, non-rigid band like a belt) just tightly enough to allow insertion of a finger without force beneath the band.
4. Make a linear incision, *no deeper than the skin*, from ¼ to ½ inch long through each fang puncture. (Don't make "X" cuts.)
5. Apply immediate suction to the wound area.
6. Transport the victim immediately to medical help.

Pitfalls

1. Don't prolong suction—lymph constriction and suction are of little value more than 30 minutes after the bite occurs.
2. Don't give the victim alcoholic beverages—they only cause poisons to spread more rapidly.
3. Don't allow the victim to exert himself—exertion aids the spread of venom.
4. Don't apply a tight tourniquet unless envenomation appears catastrophic—a tight tourniquet can cause gangrene.
5. Don't chill with ice—it can cause destruction of tissue and may lead to amputation.

the Florida Medical Association: A tourniquet lightly occlusive in the field during a 30-60 minute period of incision and suction has not been proved to be of value experimentally, but would seem to possess some advantages. In unusual situations where the immediate systemic effects of the bite appear to be catastrophic, a completely occlusive tourniquet may be elected with knowledge that sacrifice of the extremity may be necessary for preservation of life. If medical care is hours away and symptoms are advanced (grades 3 or 4), therapy of this type—although radical—could prevent a fatality or more extensive damage to the limb. Release of such a complete tourniquet prior to amputation could have fatal consequences because of the immediate release of the poison into the blood stream. Antivenin [a serum which contains antitoxins or substances which act against the poison] should be given intravenously before releasing the tourniquet, the researchers concluded.

Two experimenters, Ya and Perry, determined that "incision-suction is probably of some benefit in treatment of snakebite. However, the spreading of venom incidental to manipulation and the possibility of damage to important structures probably outweighs the value to be gained from first aid measures . . . ."

If the bite has gone deeply enough to enter muscle, it's difficult to suck venom out. If the bite is within the skin, then immediate incision and suction will recover some poison before it spreads. Ya and Perry concluded that incision-suction treatment should be used only in circumstances when no other treatment is available or will be available for many hours. They found that after 30 minutes, incision and suction was entirely useless.

Snakebite treatment by chilling (cryotherapy) was once popularized and accepted even by professionals. However, it has since been substantiated that this therapy can lead to more severe damage than if it were not used at all. Dr. Newton C. McCollough of Orlando, Fla., sums up the treatment: "The mere continuous icing of a hand for 12 to 24 hours could in itself alone, without the presence of snakebite, result in loss of fingers, if not the entire member. The deceptive feeling of well-being and lack of swelling of a snakebitten extremity which follows the initial pain of ice packing are rapidly and dramatically reversed when the warming-up period occurs. The spread of venom throughout the immersed portion has not been slowed one iota, even though temporarily, its destructiveness is delayed. . . ."

It has been substantiated that chilling makes antivenin treatment much more difficult by preventing antivenin in the blood stream from freely entering the bite area. There is general agreement that icing or cryotherapy has no place in the treatment of snakebite. The immediate bite area can be cooled to help relieve pain, but general chilling of a leg or arm should be done only if amputation is anticipated.

If mechanical methods of treatment have pitfalls, what then is recommended? Informed doctors agree that the most beneficial first aid which can be given a snakebite victim is to keep him as quiet as possible and immobilize the bitten area. He should not be allowed to swallow alcoholic stimulants as this will speed up circulation and help distribute poison through the body. The patient should be taken to a hospital as soon as possible. Clinically, the most effective treatment is antivenin administered directly into a vein.

There will be cases, of course, where medical help is hours away or where the symptoms of poisoning are so severe and evolve so rapidly that great urgency must dictate treatment. If you anticipate situations where several hours may be needed to reach medical help, invest in a Wyeth antivenin kit. Don't confuse this kit with the many kinds of "suction" kits on the market. It is available at drugstores, by prescription, and costs about $16.

If you are hours from medical attention, the first aid procedure of keeping the victim as quiet as possible and immobilizing the bitten area still applies. Use the antivenin as soon as possible. Directions about its use are included in the kit and it may even be administered by the victim himself if necessary. The kit contains vials of powder, a hypodermic syringe and water for mixing the serum. The kit doesn't require refrigeration, so it can be carried into the field. Dosages are somewhat experimental even in hospitals, but it must be remembered that the smaller the body, the larger the dosage required. Ideally, the first dosage should be strong enough to overwhelm the poisons. Additional shots, however, will be required as swelling continues to advance and other symptoms of poisoning recur or increase in severity.

Snake antivenin is not taken without some calculated risk. Base of the antivenin is horse serum which causes a severe allergic reaction in some persons. Included in the kit is a test sample of serum to determine whether persons are allergic to horse serum before antivenin is administered. A small amount of the test serum is injected into the skin. A reaction in allergic persons will occur in 5-30 minutes and will be indicated by welting or a more severe skin reaction at the site of the skin test. In general, the shorter the interval between injection and the beginning of the skin reaction, the greater the sensitivity. If a strong positive reaction occurs, administering the antivenin may be dangerous. Then, conditions and severity of the snakebite symptoms must be weighed against the hazards of reaction to the serum.

A negative skin test is not 100% conclusive proof that a serious immediate reaction might not occur. It also does not indicate whether a delayed reaction or serum sickness could occur later.

But in spite of the hazards, antivenin is the best single remedy for snakebite.

cooking the wild berry

by Kay Ellerhoff

Why take the time and effort to gather wild berries when the supermarket contains an array tempting to just about any palate? Surely elderberries, chokecherries and huckleberries are good—but so are strawberries, blueberries and raspberries.

Our world has grown increasingly complicated and it seems to me that doing some of the things our grandparents did can bring us closer to nature.

Others must agree, because the sale of backpacking equipment, camping gear and other outdoor items has zoomed. Our grandparents *had* to utilize nature's bounty in order to make it through long, difficult winters. Our knowledge of outdoor foods may not be necessary, but it can deepen an appreciation of the outdoors, cut down on grocery bills and provide a great "excuse" for the whole family to do something together.

Besides, there's great satisfaction in picking berries, canning them or making jam, jelly or wine from them, and then seeing the products of your endeavors lining basement shelves all winter long. The purple-tinged fingers, the hot summer sun beating down as you fill one more bucket with berries and the delicious spurt of flavor as you plop one after another into your mouth are pleasant recollections on a winter afternoon.

Some general hints might be helpful if you haven't already joined the flock of dedicated berry foragers and gatherers. We use old metal Prestone cans as buckets. The tops have been fitted with "V"-shaped hooks, fashioned of heavy wire. I always make it a point to wear a belt when picking berries—I hook my belt through the loop on the Prestone can and I've alleviated the chance of kicking over a whole afternoon's work and watching those purple gems roll down the hillside. In addition, the hook device enables you to use both hands for picking, instead of worrying if your berry container is keeping pace with your picking progress.

Don't fill containers too full because you'll crush the berries on the bottom. When you decide to pick

Left, chokecherries. Above, elderberries. F&G photos by Bill Schneider

berries, obtain shallow cardboard boxes from the grocery store. Line them with waxed paper and then place the berries in them, no more than a couple of layers deep. When you get home, you'll have whole, fresh berries, rather than burgundy-colored globs of mashed fruit.

Put the fruit into the refrigerator unwashed and unstemmed, or store it in a cool basement. Any handling causes bruises which result in more rapid spoilage and vitamin loss. Just before you get ready to use the berries, quickly wash them under cool water. Discard any which rise to the top of the water. (Worms have usually eaten the center of the berries, making them lighter.) The sooner you make your jelly, jam, wine, pie or whatever, the better your final product will be.

To freeze berries, pick over the fruit and discard any bad berries. Don't wash them, just place them, dry, in sterilized jars and freeze. You'll find they don't stick together and you'll be able to pour out a cupful whenever your fancy demands berries and cream.

Our grandparents didn't have freezers or easy access to fresh fruit through the winter so the values of dried berries were utilized:

Dried Berries

The berries were picked when ripe and carefully cleaned by washing with water. The bad berries and leaves float, making it easy to pick them out. They were then spread out on a screen or sheet to dry in the sun. Everyday they were moved about by hand to make sure they would not mold.

When thoroughly dried, they were placed in a container. Sacks or stone crocks were commonly used. The berries were eaten dried or cooked as you would dried fruit today.*

ELDERBERRIES

Elderberries offer one of nature's most abundant sources of vitamin C, more than citrus fruit or tomatoes. They also have a high fat content, protein and carbohydrates.

You can't miss elderberries—they are characterized by umbels (which resemble open umbrellas) of purple-black berries. When they're ripe, the umbels weigh down the stems and beg to be snipped off and put into your bucket.

Members of the honeysuckle family, about six distinct species occur in the Rocky Mountain area. The most common is probably *Sambucus pubens*, or scarlet elderberry. *Pubens* means "hairy" and that's this variety's distinguishing characteristic—the underside of the leaves is hairy. Look for it in moist, wet soil along streams or rivers and in areas bordering coulees. Berries are ripe in late August or early September, depending on altitude.

The plant provides browse for elk, deer and moose. The berries are prized food for many birds, including ruffed, Franklin's and blue grouse. Bears will also offer competition for the tangy berry.

Another common species in Montana is *Sambucus coerulea*. It produces blue or purple berries that perhaps make the best jelly—at least it's my favorite of all berry jellies: continued

**The notes on dried berries and other asterisked recipes in the chokecherry section are from "Recipes and Remedies of the Pioneers," Montana Centennial Edition, 1964. They are used with permission of J.F. "Tag" Rittel, author, and Lyla Rittel, illustrator.*

Elderberry Jelly

If you use a commercial pectin, follow the package instructions. Elderberries differ from most berries because they are not cooked to liberate the juice. Therefore you must crush them *thoroughly* and perhaps add a little water to start the process. After you've obtained sufficient juice, let it drip through a moistened jelly bag.

To each 3¼ cups of elderberry juice, add about ¼ cup lemon juice. Add the pectin, stir thoroughly and bring to a boil. Add the already measured sugar, about 4½ cups, and stir until a full rolling boil is reached. Boil for two minutes and then make the "spoon test" described in the jelly-making photos.

Or, you might enjoy:

Elderberry Delight

Boil 4 apples in enough water to cover them. Remove from heat, drain (save the juice) and put apples through a sieve.

Quick-boil the elderberries (about 1 cup) in the apple juice for 1-2 minutes. Pour the berries into the sieved apples. Add fresh lemon juice and honey to taste. Garnish with a pinch of wheat germ. Serves 2.

CHOKECHERRIES

If your luck at finding elderberries isn't too great, try chokecherries, which belong to the same family as roses. They grow in moist soil along creeks, especially in valleys, as well as on hillsides and mountain sides.

The most common species in Montana is probably *Prunus virginiana.*

Pheasant and grouse find them delicious, and deer and elk browse the plants. The leaves contain a substance which, when acted upon by a certain enzyme present in some animals, produces hydrocyanic acid (prussic acid). The leaves are extremely toxic to some domestic animals, including sheep. But mountain goats frequently consume the plant's stems and leaves with no ill effects.

Chokecherries make lovely jelly, syrup, wine and surprisingly:

Chokecherry Dill Pickles

Wash large cucumbers in cold water until clean. Pack in crock or jar; first a layer of chokecherry leaves, a layer of dill, then a layer of cucumbers. Then another layer of chokecherry leaves, etc. Until you have the amount desired. Cover with a mixture of salt and water mixed 1 cup of salt to three quarts of water.

Let stand two weeks. Then remove and cut into long slices and pack into fruit jars. Fill jars with following hot syrup: 1 cup vinegar, 2 cups sugar and 1 teaspoon mixed pickled spices. Add a twig or two of dill. Seal jars.*

Or try the following syrup to garnish sourdough pancakes, waffles or other hot breakfast breads:

Chokecherry Syrup

Clean stems and leaves from berries. Place in large kettle. Cover with water and cook. When berries are pulpy remove and pour juice and berries into press.

In boiling the juice and sugar, use equal amounts of each ingredient for best results. Do not boil too long as it will jell. Pour into clean half pint jars and seal.*

If you want a little "nip" of something to sustain you through a long, cold winter, try a recipe tested and approved by Montana's early-day settlers:

Chokecherry Wine

Place a wooden barrel on its side so that you have an open bung on the top. Make sure the barrel is at least six inches off the ground. Boil your chokecherries with just enough water to cover. Boil until berries are well cooked. Drain off juice and pour berries into white sugar sack and squeeze. Let drain. Fill barrel with juice. In a few days the berry juice will begin to ferment. As it ferments, the juice will boil out in bubbles. Add melted sugar to barrel, keeping fluid up to bung hole. When the juice no longer boils or bubbles out, cork hole and set in cool cellar for at least one year. Your wine will work in the barrel and age. You will find this a very sweet tasting wine.*

Pioneers didn't have 10-minute access to doctors, so many of their cures came right from the backyard. Next time you're stuck with dysentery, you might try chokecherries, dried, pounded and mixed with dry fish and sugar. Take a tablespoon every hour.*

Chokecherries also make a delicious:

Norwegian Fruit Soup

After preparing the juice, add to it an equal amount of water. Grate the rind of one lemon and add 1 whole stick of cinnamon. Boil for 30 minutes; strain. Sweeten it to taste and thicken it slightly with cornstarch (mix a bit of the liquid into the cornstarch before adding to the main broth). Bring to second boil. Cook until the soup clarifies and thickens slightly.

Either hot or cold, it's a great soup course or dessert, especially with a feast featuring wild game.

HUCKLEBERRIES

The interesting thing about picking huckleberries in Montana is that you're not. No true huckleberries grow in the state. The berries growing in Montana which we call huckleberries are actually members of the *Vaccinium* genus, or blueberries. Six distinct species grow in Montana, with the most common probably the *Vaccinium ovalifolium.*

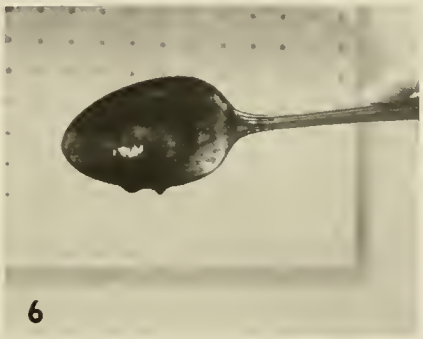
Huckleberries abound in Yellowstone and Glacier National parks and in areas with highly acidic soil. They prefer mountainous terrain characterized by granite rocks. Old clearcuts, lumbering areas, old burns, creek bottomlands and old access roads offer good chance of finding the deep purple fruit. (For a complete treatment of Montana's huckleberries, see the July/Aug. 1973 *Montana Outdoors.*)

The berries are utilized extensively by grouse, ptarmigan, rodents, marten, coyotes and many other birds and mammals. Both black and grizzly bears claim them as prized fare. And, in fact, the bears may move to specific areas to utilize the ripening fruit, so keep a sharp lookout. Deer and elk consume leaves and especially enjoy the plant's new growth.

Indians made a mixture of plump berries and dried meat which provides an ideal backpacker's lunch today:

Pemmican

1 cup dried meat (jerky)
1 cup dried huckleberries
1 cup unroasted peanuts or pecans
2 teaspoons honey
4 tablespoons peanut butter
¾ teaspoon cayenne pepper



Making Huckleberry Jelly: *Wash berries; measure approximately 3 qts. into deep kettle (1). Crush thoroughly (2) and bring to boil; cook until juice is released, about 5-10 minutes. Pour into muslin jelly bag, already moistened, and allow to drip for several hours or overnight (3). For clearest jelly, do not squeeze bag. Measure 3¼ c. juice; add ¼ c. lemon suice. Pour into deep enamel or stainless steel kettle. Have ready 4¼ c. sugar. Add pectin to juice in kettle. Bring to boil, stirring constantly. Add sugar, mix well (4). Bring to a full rolling boil (5), one that cannot be stirred down. Boil for 2 minutes or until two drips form when jelly is tested on a stainless steel spoon (6). Remove from heat. Skim off foam and pour into sterilized jars (7). Seal with paraffin (8). Insert a short section of string to make paraffin removal easier. Let stand for 24 hours; then wipe jars to remove any sticky jelly. Store in a cool place. F&G photos by Craig Sharpe*

Pound the meat into powder or grind with a blender.

Add the dried berries and nuts. Here the recipe can become really elaborate with dried raisins, apricots and peaches added, too, but remember to add proportionate amounts of the other ingredients for each new fruit.

Heat honey and peanut butter to soften it, then blend with the mixture. Add the pepper and make sure it's worked thoroughly through the mixture.

To go completely natural, pack the mixture in sausage casings available at meat counters or put the mixture in plastic bags or containers.

Keep in a cool, dry place and it will keep indefinitely.

To make an easy, tasty uncooked huckleberry jam, you might try the following Scandinavian method:

Rorte Baer

Mix together 1 pound (4 cups) huckleberries and ¾ pound (2 cups) sugar with an electric mixer until the juices run and the berries are reduced to a pulp. The berries absorb the sugar, which acts as a preservative.

If you don't have an electric mixer, combine the berries and sugar and stir whenever you happen to walk by. Continue for three days.

Pack in sterilized jars.

The variety of uses for the wild berries is limited only by your imagination and ingenuity in the kitchen. It doesn't matter if you come up with elderberry delight, chokecherry syrup or huckleberry jelly —get your family together and head for berry country. You'll have a wonderful day.

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